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Introduction

The purpose of this troubleshooting guide is to provide fast solutions to problems that a bowling center may experience and give you techniques that you can use to resolve problems not specifically addressed in this guide. Using this guide prior to contacting Brunswick's Customer Response Center will not only speed your troubleshooting efforts, but will give Brunswick's technicians valuable information should calling the Response Center be necessary.

This guide contains flowcharts to help the mechanic quickly solve common problems that may be encountered. It is assumed that the troubleshooter is familiar with the components and terminology used in the Vector system and the basic operation of a multimeter and cable testers. For additional information about these topics, consult the Vector Scorer Service Manual (57-900621-000) or the instruction manual that was sent with the multimeter or tester.

Troubleshooting Techniques

Troubleshooting the computers and electronics that make up a scoring system can be a challenging task. The symptoms exhibited by a problem may be a caused by hardware issues such as faulty cabling, damaged circuit boards, or bad connections, it can be attributed to software issues such as improper setup, faulty configuration, or a software glitch, or it can even be a onetime event that causes the problem.

To make matters worse it may be a combination of these things. Despite these seemingly endless possibilities, anyone can troubleshoot if they use a systematic approach and ask the right questions. Without a systematic approach you risk wasting valuable time and resources.

Your approach to the problem is just as important as what you do to diagnose it. The most important thing to remember is to remain calm and take your time. It is not unusual to have your mind flooded with possible causes and solutions. The challenge is take the time to determine which of these ideas make sense. Keep an open mind and explore all possible causes for the problem, but make sure to follow only those possibilities that are related to the problem. If you find yourself getting tired or frustrated, take a break (if possible) and try again later. Finally, don't be stubborn about seeking help if you need it.

Preparation

It is inevitable that something will happen that will require troubleshooting and the setup, replacement, or repair of components in your scoring system. Therefore it is important to prepare for that day. What good is finding the cause of a problem if you don't have the knowledge, equipment, or parts to fix it?

Knowledge:

The more you know about your system before problems occur the easier it will be to troubleshoot. You can find specific information in the Vector Scoring System Service manual supplied with the system (or download the most recent revision from www.brunswickbowling.com). Related information about computer hardware, software, and networking can be found on the internet or in local bookstores. Either way having the knowledge upfront can save you time later.

Attend seminars or schools related to your equipment. These can be anything from the Brunswick Vector Service School to seminars on computer hardware and troubleshooting.

Another source of information is other mechanics. Their experience may help you understand the system better and give you insight to diagnose problems faster. A few web sites dedicated to bowling center maintenance even include forums through which mechanics can communicate. One word of caution, the information obtained from these types of sources may come from an uniformed or biased person. If necessary, solicit advice from more than one person.

Tools:

Using the proper tools will make any job quicker and easier. Therefore, always have the proper tools on hand to correct or diagnose problems should they occur. Knowing what diagnostic tools are available and how to use them is equally important. If necessary, read the users manual that come with the tool and practice how to use it before you actually need it for troubleshooting.

Spare Parts:

Verify that you have adequate replacement parts on hand and that they are in good working order. Don't assume that they are functional just because they are new. Get into the habit of rotating your spare circuit boards into your system on a regular schedule. That way when you go to use components from your spare parts, you can be confident that they work.

If possible, pre-configure any components that require setup. This can save valuable time when you are trying to get the system up and running.

Backups:

One of the most important (and often most valuable) parts of your system is the information stored on the computer(s). You can save time and reduce frustration if you backup (make a copy) this information. That way if a problem occurs, the solution may be as easy as restoring the computer to a time when it was functioning properly.

Troubleshooting Steps

Troubleshooting is not simply finding the cause of a problem and fixing it. Troubleshooting is more properly defined as identifying the specific symptoms, listing the potential causes of the symptoms, and then eliminating these potential causes one by one. In other words troubleshooting is a process of elimination.

Step 1: Identify the Specific Symptoms:

Identifying the specific symptom can be the most difficult part of troubleshooting. Many times you need to rely on second hand information or, at the very least, information that come from an uniformed source. Many times the person providing the information will have a different perspective of the equipment than that of a mechanic or may use different terms to describe the situation. Because of this always verify and clarify what you are told. If you don't, you might be troubleshooting problems that don't exist.

Step 2: Make a List of Potential Causes of the Symptom.

Once you have identified the symptom(s), use your manual, experience, and any other source of information to make a list of things that may have anything, whatsoever, to do with the symptom. Put it on your list even if it may not be a likely culprit.

Step 3: Prioritize Your List

Reorder the list. Put items that are most likely causes at the top and work your way down to the least likely. During this step you should ask questions such as "Has anything changed recently", "Has someone worked on the system", "Has software been updated or re-configured", "Is this and easy or hard thing to check". The answers to these types of questions can influence the position of the items on the list.

Step 4: Eliminate Potential Causes

Try to eliminate the first item on your list. Depending on the item, this can be done by swapping components or cables connections, altering configurations, taking voltage measurement, or by simply observation. Whatever you can safely do eliminate the item as a cause is acceptable. Be as creative as necessary but remember that you don't want to do anything that might damage the system or that you can't undo. IF YOU ARE UNSURE ABOUT SOMETHING: DON'T DO IT. Also remember to properly configure any component that you swap or replace (if required). If the prior steps were done properly, you will eventually get to an item that cannot be eliminated as the cause.

Step 5: What to Do if Steps 1 -4 Didn't Solve Your Problem

If after following steps 1 -4 you still have not solved your problem, you need to start again. Verify each step to ensure that good decisions have been made. Talk to others that are knowledgeable about your system. Many times just talking with someone will give you a fresh perspective on things and may give you ideas that weren't considered the first time around.

Additional Tips

Cycling power (powering the unit off, then on) or re-seating a connector or circuit board corrects most problems.

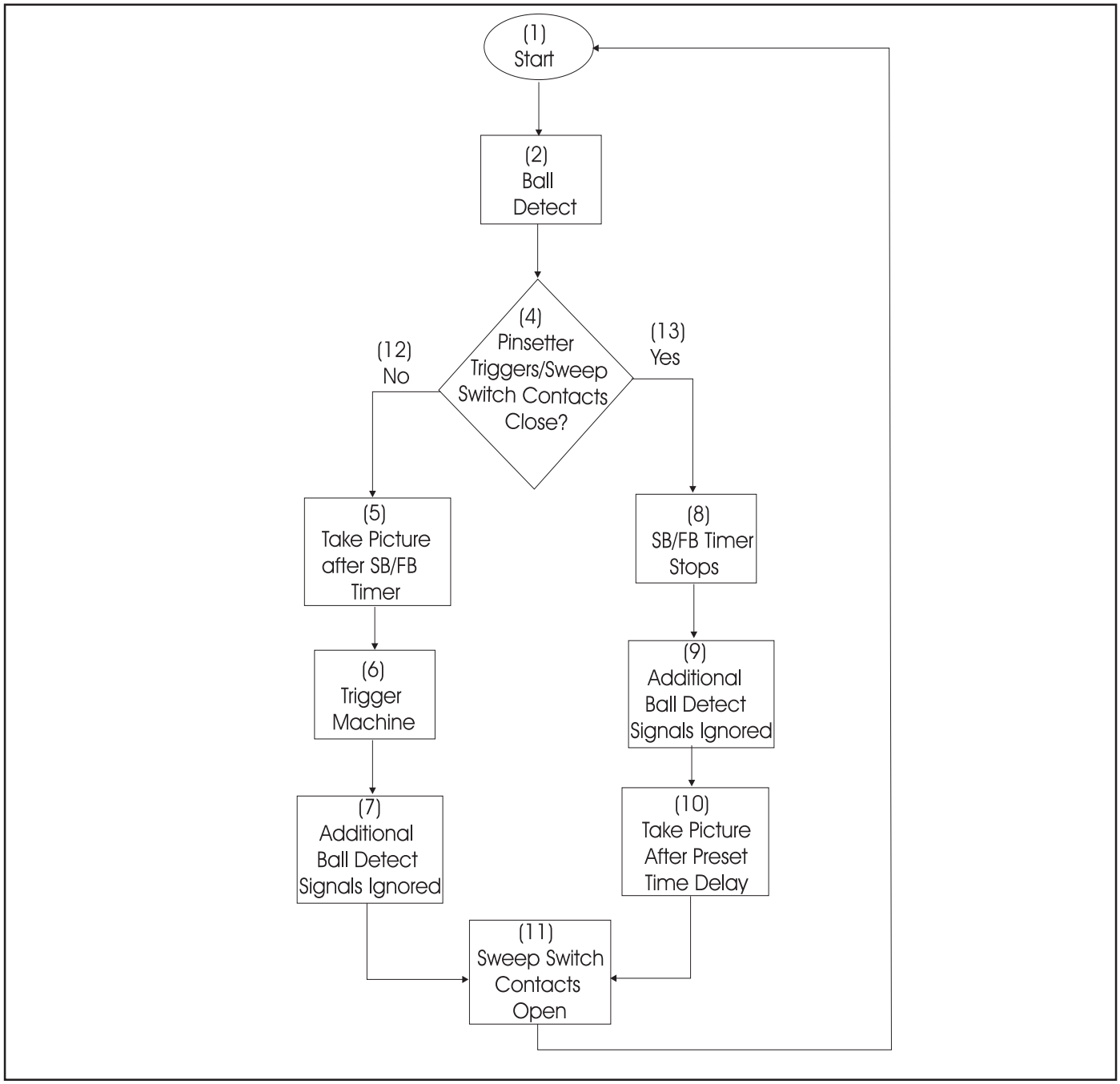
Always verify that a replacement component is actually defective by installing it in another unit.

The simplest solution is normally the correct one and the one most often overlooked.

Scoring Issues

Circuit Description:

Scoring for a non-GS pinsetter involves using a camera to take a picture of the pins, analyzing the picture, and calculating the score based on user specified settings. The scoring for a lane begins when the ball passes through the ball detector beam. If the contacts of sweep/rack switch mounted on the pinsetter are “Open”, the Distribution PCB located behind the camera accepts the ball detect signal and begin the scoring process. Refer to figure titled *Non - GS Pinsetter Circuit Description.*



Non - GS Pinsetter Circuit Description

Once the picture is “taken” it is sent to the Video3 PCB where it is analyzed and compared to the calibration parameters set on the Pin Setting Screen.

Typical causes of scoring errors are:

External Influences

1. Pin Condition
2. Excessive reflections in pit area.
3. Improper lighting.

Hardware

1. Camera
2. Distribution PCB
3. Video3 PCB
4. Primary Patch Panel
5. Cabling
6. Ball Detectors
7. Sweep/Rake switch on pinsetter.

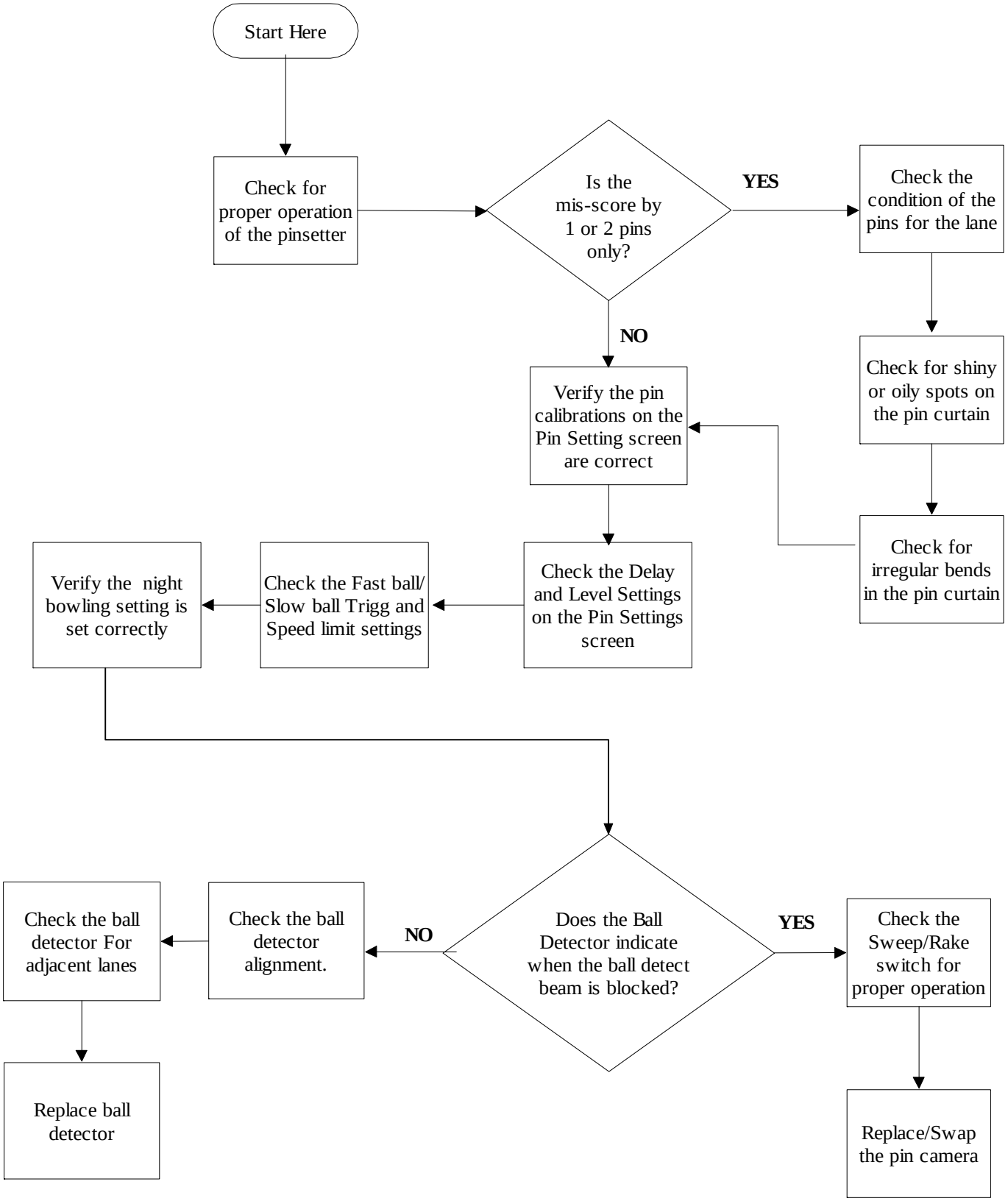
Setup

1. Pin calibration on the Pin Setting Screen
2. Time Delay settings on the Pinsettings Page
3. Video3 Contrast adjustment
4. Sweep/Rake switch actuator position.

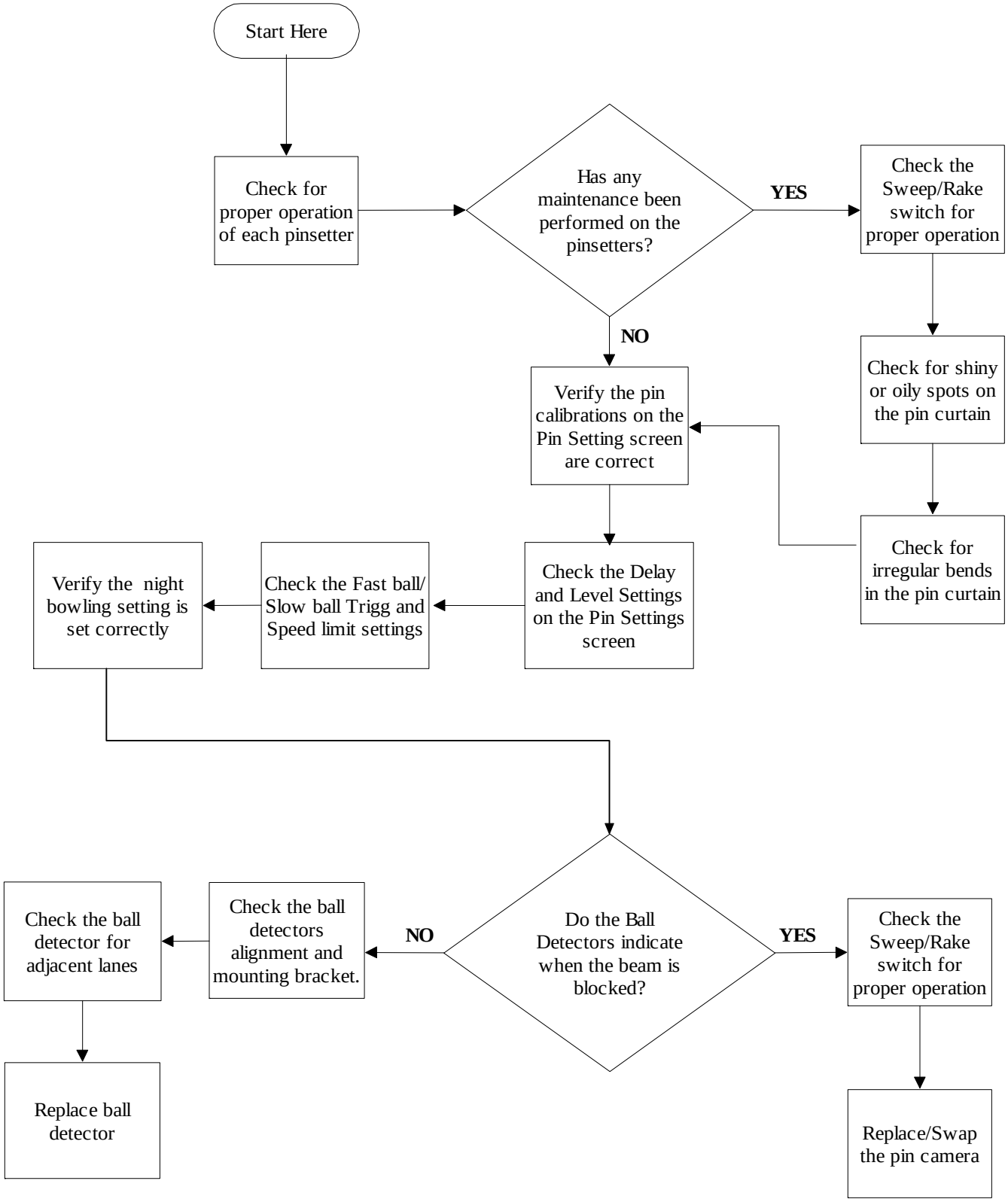
For all GS-Series pinsetters scores are generated in the pinsetter’s electrical box.

Nexgen and later Consolidated electronics connected to the Scorer Computer through an RS-232 converter box. Earlier Consolidated electronics and Universal electronic systems connect to the Scorer Computer via a GS-controller. Typically, if scoring errors occur for a GS-pinsetter, the problem is in the pinholder(s) of the machine or an adjustment to the setting table such as the stroke limiter or table level. Fail to score situations may be attributed to one of the interface boxes, the electronics of the machine, or to the Video3 PCB.

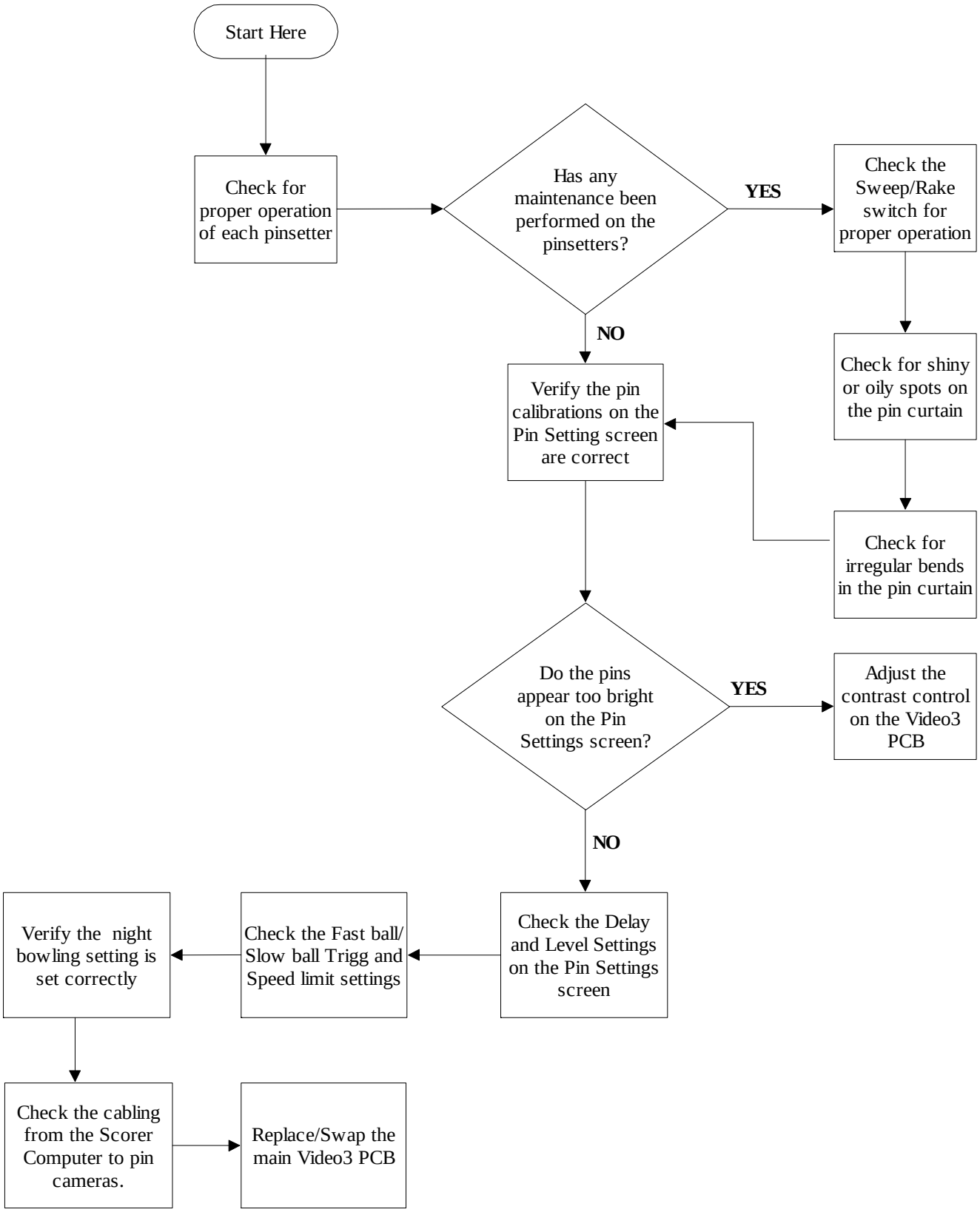
Mis-scoring On One Lane (Non - GS Pinsetters)


Start Here
Check for proper operation of the pinsetter
Is the mis-score by 1 or 2 pins only?
YES
Check the condition of the pins for the lane
Check for shiny or oily spots on the pin curtain
Check for irregular bends in the pin curtain
NO
Verify the pin calibrations on the Pin Setting screen are correct
Check the Delay and Level Settings on the Pin Settings screen
Check the Fast ball/ Slow ball Trigg and Speed limit settings
Verify the night bowling setting is set correctly
Does the Ball Detector indicate when the ball detect beam is blocked?
NO
Check the ball detector alignment.
Check the ball detector For adjacent lanes
Replace ball detector
YES
Check the Sweep/Rake switch for proper operation
Replace/Swap the pin camera

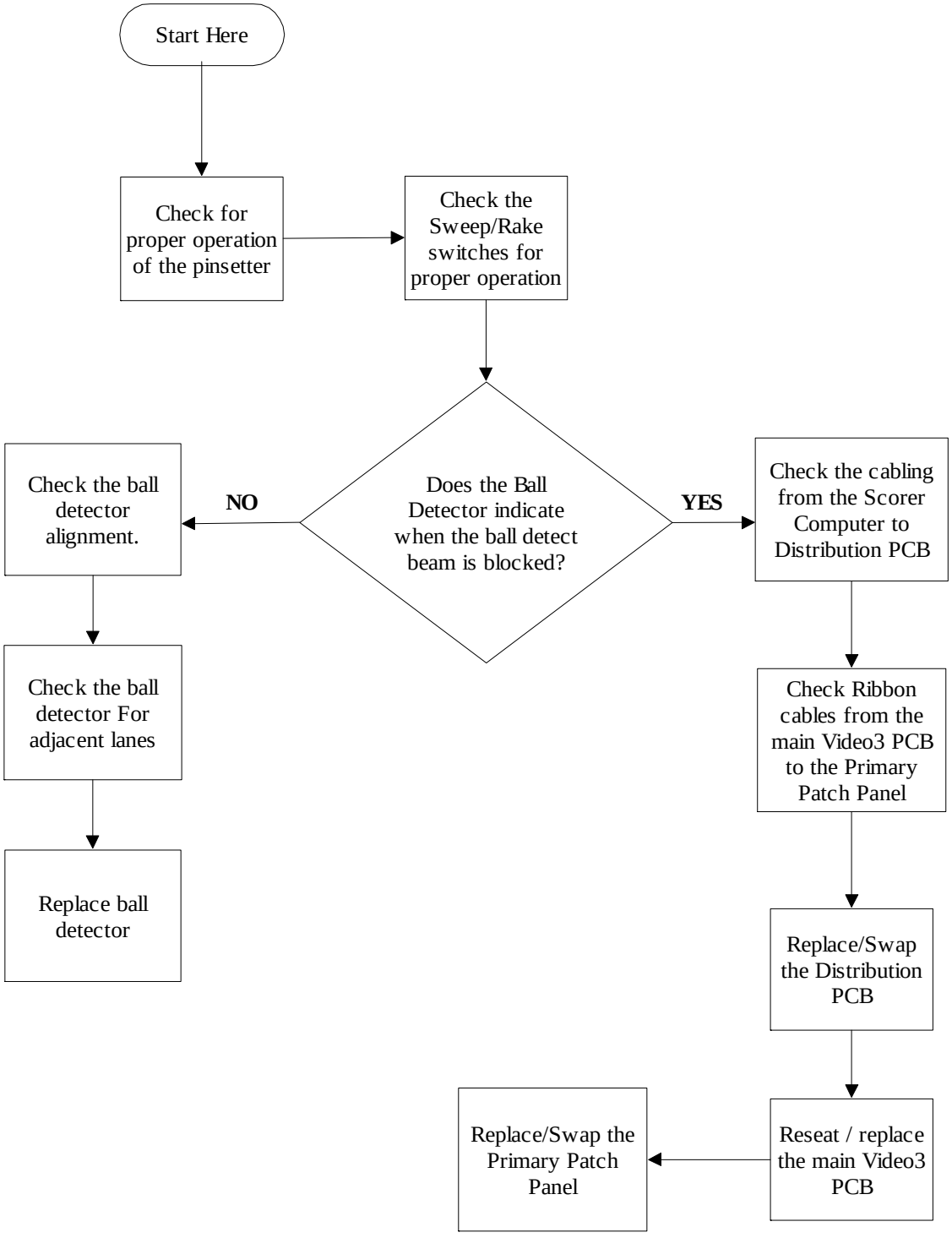
Mis-scoring On Both Lanes (Non - GS Pinsetters)


Start Here
Check for proper operation of each pinsetter
Has any maintenance been performed on the pinsetters?
YES
Check the Sweep/Rake switch for proper operation
NO
Check for shiny or oily spots on the pin curtain
Verify the pin calibrations on the Pin Setting screen are correct
Check for irregular bends in the pin curtain
Check the Delay and Level Settings on the Pin Settings screen
Check the Fast ball/ Slow ball Trigg and Speed limit settings
Verify the night bowling setting is set correctly
Do the Ball Detectors indicate when the beam is blocked?
NO
YES
Check the ball detectors alignment and mounting bracket.
Check the ball detector for adjacent lanes
Check the Sweep/Rake switch for proper operation
Replace ball detector
Replace/Swap the pin camera

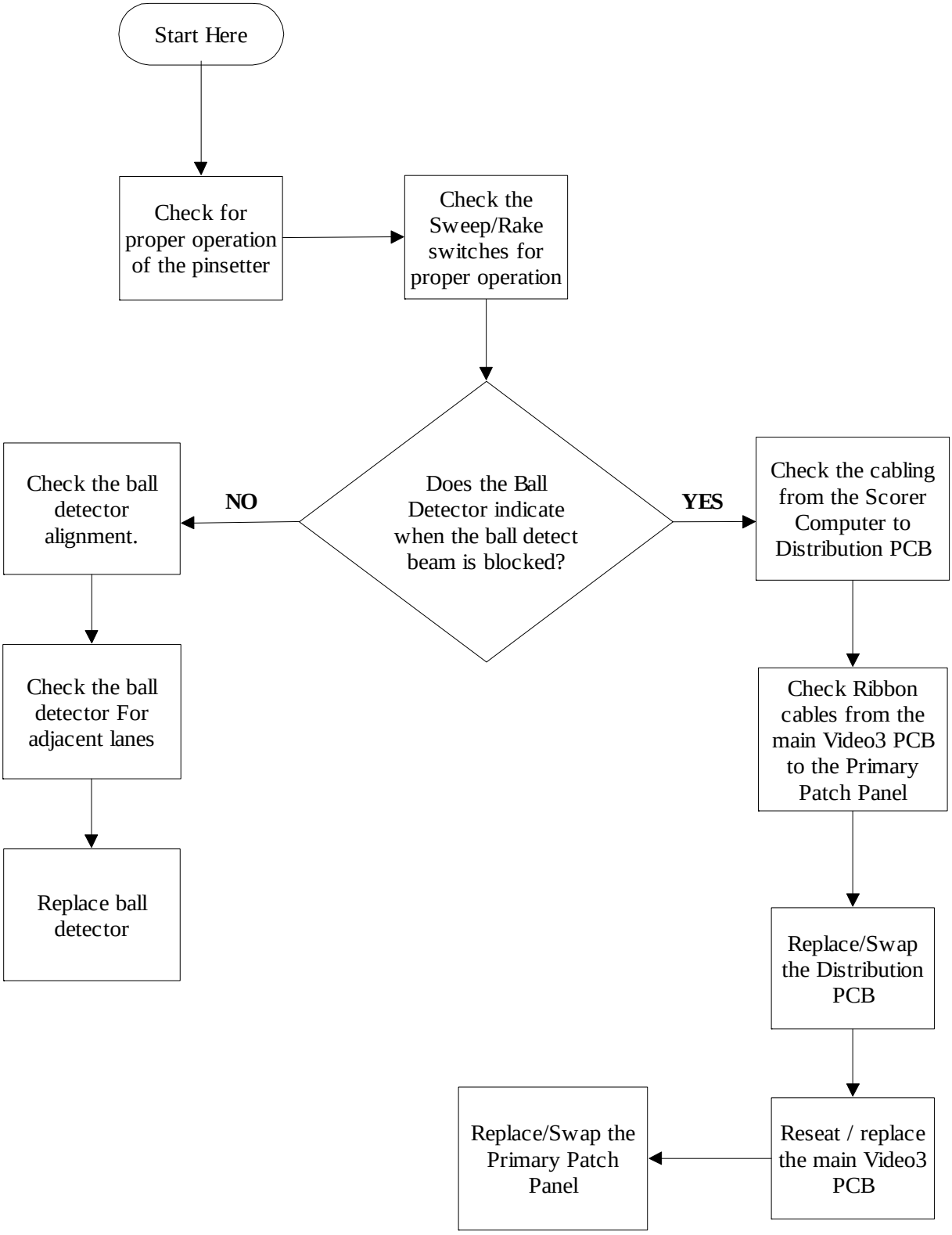
Mis-scoring On Multiple Lanes (Non - GS Pinsetters)


Start Here
Check for proper operation of each pinsetter
Has any maintenance been performed on the pinsetters?
YES
Check the Sweep/Rake switch for proper operation
NO
Check for shiny or oily spots on the pin curtain
Verify the pin calibrations on the Pin Setting screen are correct
Check for irregular bends in the pin curtain
Do the pins appear too bright on the Pin Settings screen?
YES
Adjust the contrast control on the Video3 PCB
NO
Check the Delay and Level Settings on the Pin Settings screen
Check the Fast ball/ Slow ball Trigg and Speed limit settings
Verify the night bowling setting is set correctly
Check the cabling from the Scorer Computer to pin cameras.
Replace/Swap the main Video3 PCB

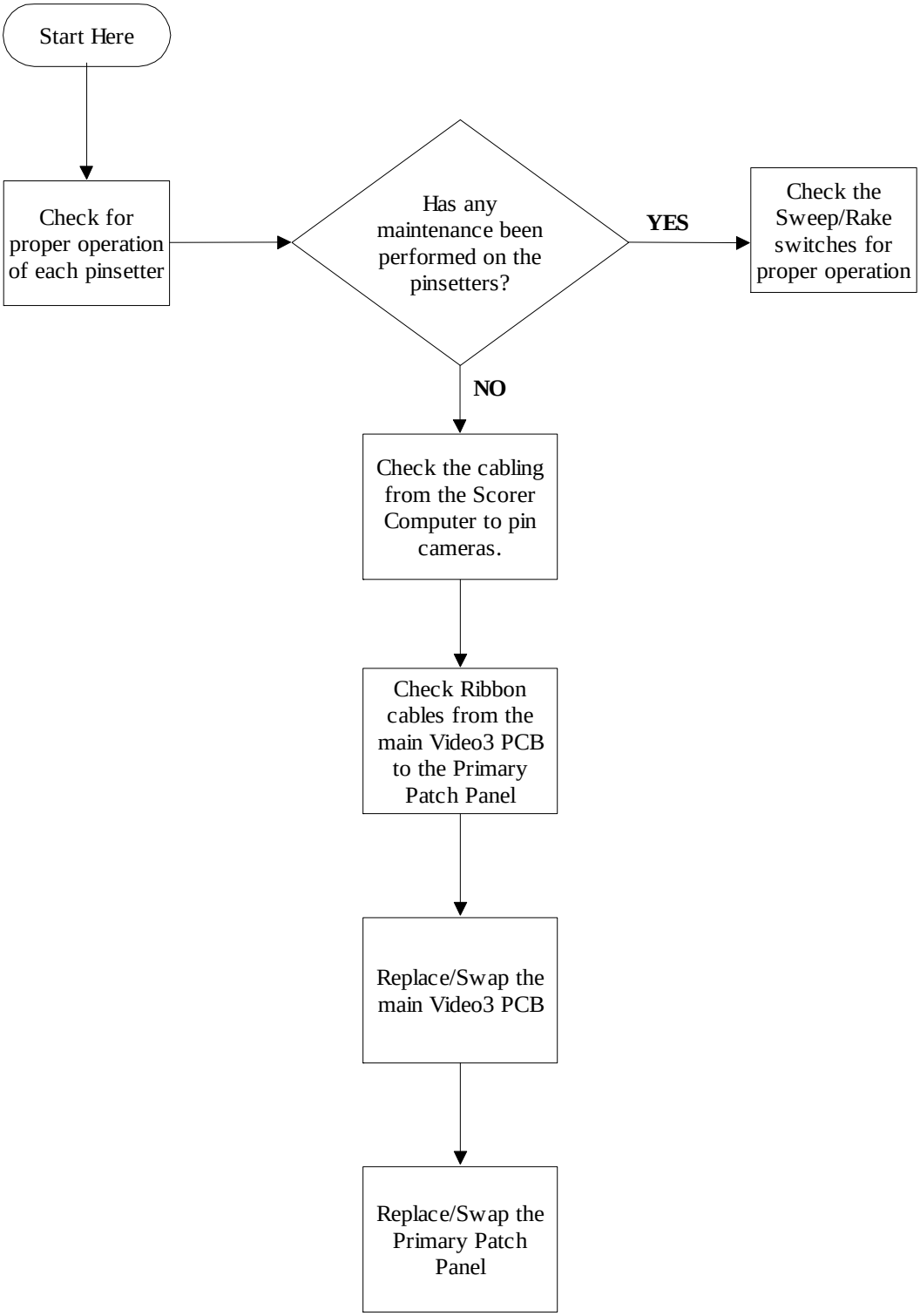
No Scoring On One Lane (Non - GS Pinsetters)


Start Here
Check for proper operation of the pinsetter
Check the Sweep/Rake switches for proper operation
Does the Ball Detector indicate when the ball detect beam is blocked?
NO
YES
Check the ball detector alignment.
Check the ball detector For adjacent lanes
Replace ball detector
Check the cabling from the Scorer Computer to Distribution PCB
Check Ribbon cables from the main Video3 PCB to the Primary Patch Panel
Replace/Swap the Distribution PCB
Reseat / replace the main Video3 PCB
Replace/Swap the Primary Patch Panel

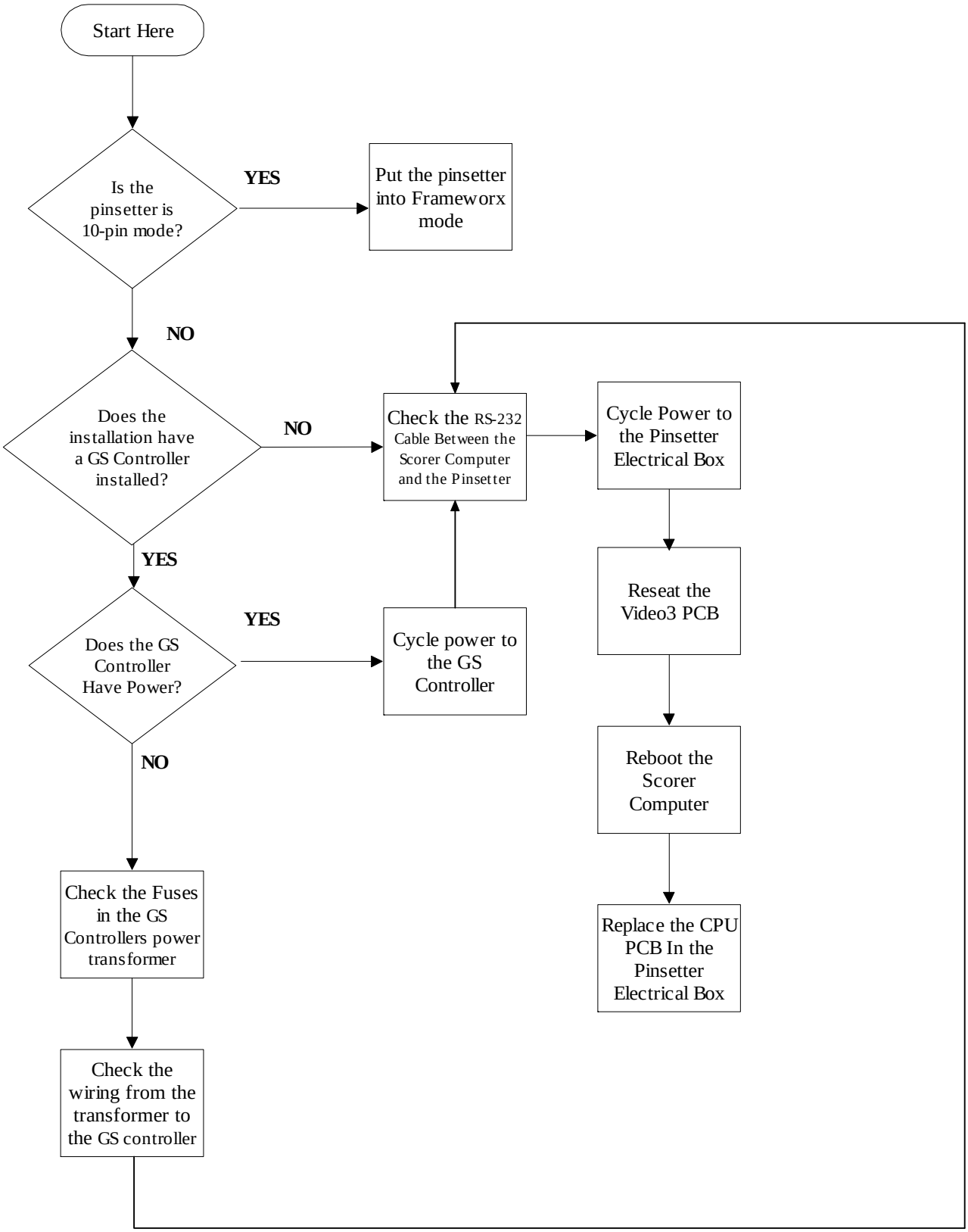
No Scoring On Both Lanes (Non - GS Pinsetters)


Start Here
Check for proper operation of the pinsetter
Check the Sweep/Rake switches for proper operation
Does the Ball Detector indicate when the ball detect beam is blocked?
NO
YES
Check the ball detector alignment.
Check the ball detector For adjacent lanes
Replace ball detector
Check the cabling from the Scorer Computer to Distribution PCB
Check Ribbon cables from the main Video3 PCB to the Primary Patch Panel
Replace/Swap the Distribution PCB
Reseat / replace the main Video3 PCB
Replace/Swap the Primary Patch Panel

No Scores for Multiple Lanes (Non - GS Pinsetters)


Start Here
Check for proper operation of each pinsetter
Has any maintenance been performed on the pinsetters?
YES
Check the Sweep/Rake switches for proper operation
NO
Check the cabling from the Scorer Computer to pin cameras.
Check Ribbon cables from the main Video3 PCB to the Primary Patch Panel
Replace/Swap the main Video3 PCB
Replace/Swap the Primary Patch Panel

No Scoring on One Lane or Lane Pair (GS Pinsetters)


Start Here
Is the pinsetter is 10-pin mode?
YES
Put the pinsetter into Frameworx mode
NO
Does the installation have a GS Controller installed?
NO
Check the RS-232 Cable Between the Scorer Computer and the Pinsetter
Cycle Power to the Pinsetter Electrical Box
Reseat the Video3 PCB
Reboot the Scorer Computer
Replace the CPU PCB In the Pinsetter Electrical Box
YES
Does the GS Controller Have Power?
YES
Cycle power to the GS Controller
NO
Check the Fuses in the GS Controllers power transformer
Check the wiring from the transformer to the GS controller

CRT Overhead Monitor Issues

Circuit Description:

Overhead video for the Vector system can be divided into two types; scorer video and Global Video.

The scorer video is created in the Scorer Computer by the main Video3 PCB. and is sent to the overhead through the Primary Patch Panel.

NOTE:

A second Video3 is installed in the Scorer Computer if lower LCD screens are installed.

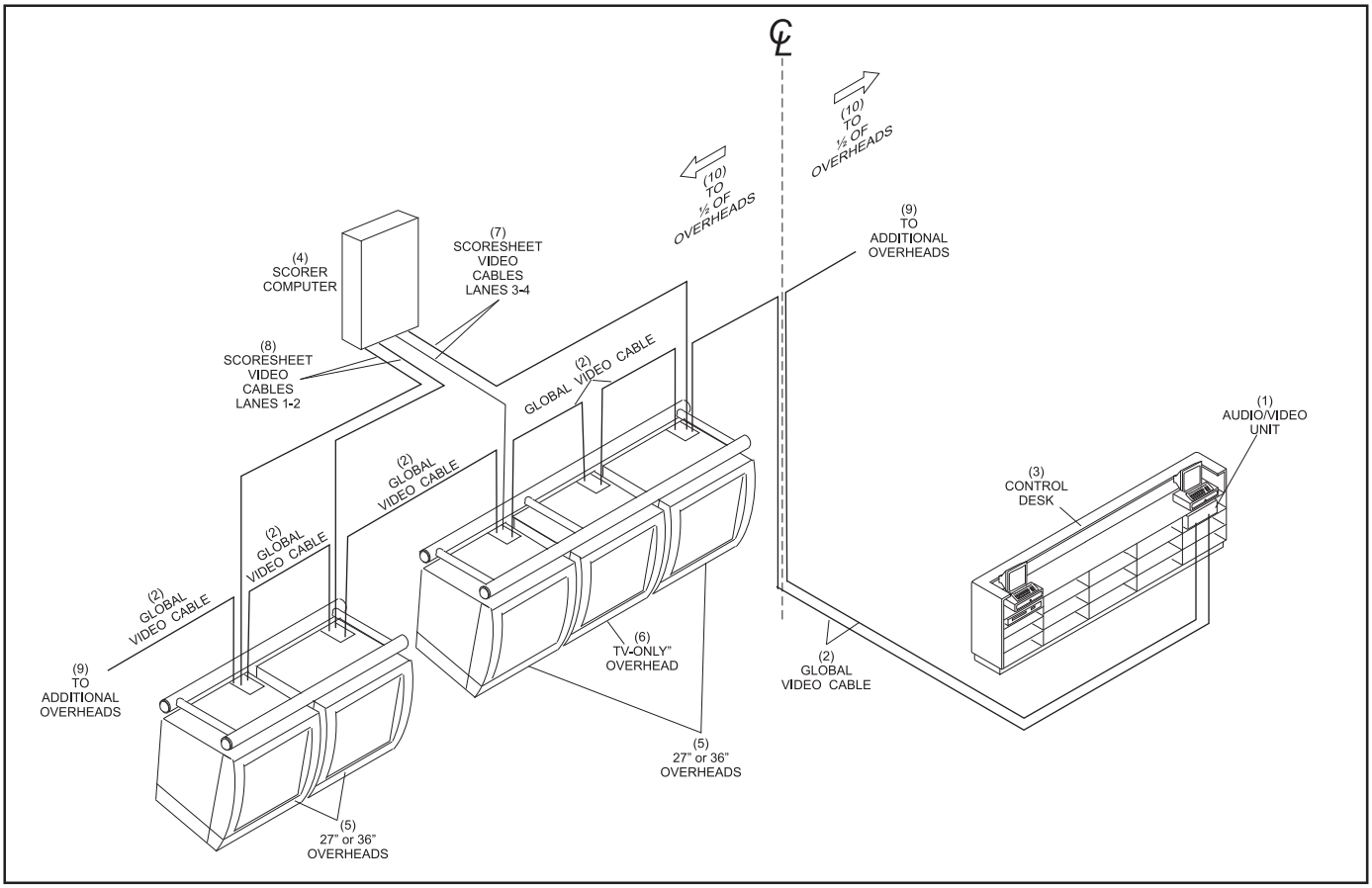
Inside the overhead monitor the Video Interface PCB "senses" the presence of the video and energizes a 12VDC relay - turning on the monitor. It also adapts the video signal so that it can be used by the Video Processor PCB.

Global Video originates as a composite signal from a VCR or other video source. An Audio/Video box located at the control desk converts the composite signal to an RGBS format. Two Global Video Cables are routed from the Audio/Video box to the middle of the bowling center where they each begin a daisy chain to the rest of the monitors. Refer to figure titled *Overhead Video Cabling.*

Like the scorer video the Global Video signal is adapted by the Video Interface PCB so that it can be used by the Video Processor PCB. A signal sent from the Scorer Computer as part of the scorer video cable, allows the Video Interface PCB to switch the overhead between scorer video and global video.

The Video Processor PCB, also referred to as the Ceronix PCB, takes the selected video from the Video Interface PCB and uses it to control the guns and deflection coils of the tube so that the picture is displayed properly.

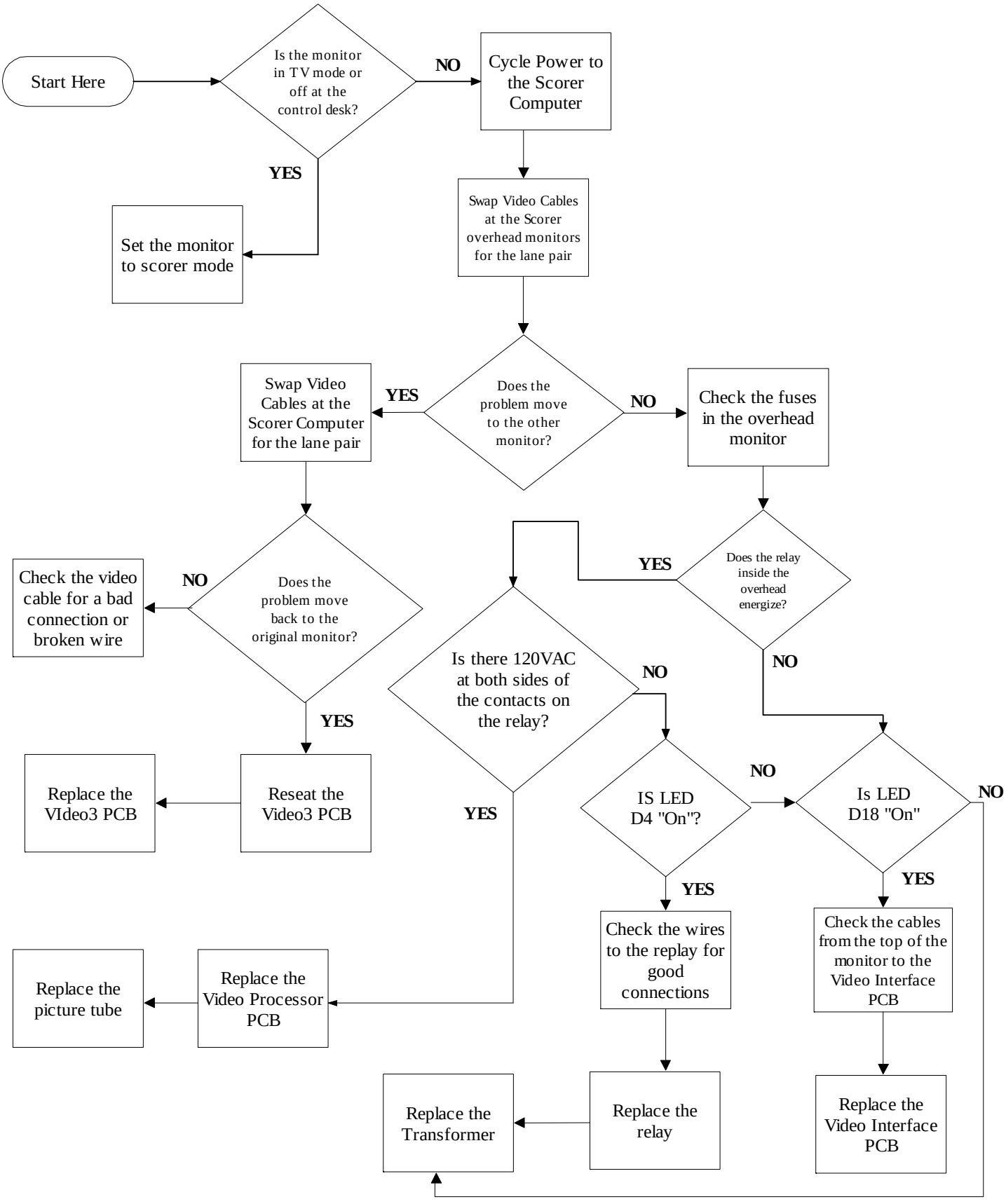
When troubleshooting video issues it is important to determine whether the problem is exclusive to one monitor or if the problem is on more than one. In addition it is equally important to determine if the problem is in the monitor or if it is external. Swapping cable connections between lanes will typically identify where the problem lies.


(10) TO ½ OF OVERHEADS
(10) TO ½ OF OVERHEADS
(4) SCORER COMPUTER
(7) SCORESHEET VIDEO CABLES LANES 3-4
(9) TO ADDITIONAL OVERHEADS
(8) SCORESHEET VIDEO CABLES LANES 1-2
(2) GLOBAL VIDEO CABLE
(1) AUDIO/VIDEO UNIT
(3) CONTROL DESK
(2) GLOBAL VIDEO CABLE
(2) GLOBAL VIDEO CABLE
(2) GLOBAL VIDEO CABLE
(9) TO ADDITIONAL OVERHEADS
(6) TV-ONLY" OVERHEAD
(2) GLOBAL VIDEO CABLE
(5) 27" or 36" OVERHEADS
(5) 27" or 36" OVERHEADS

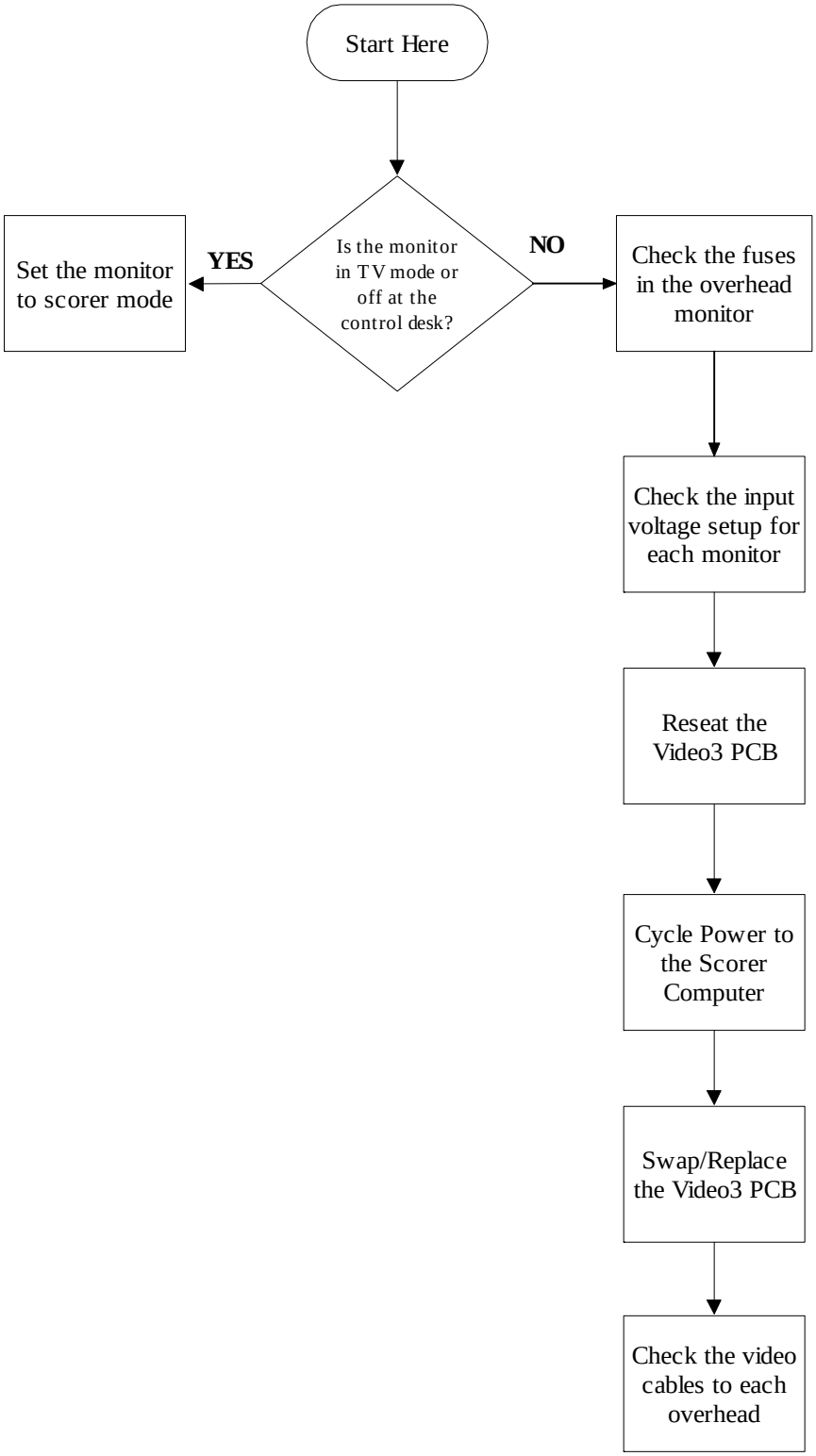
Overhead Video Cabling.

(1) AUDIO/VIDEO UNIT
(2) GLOBAL VIDEO CABLE
(3) CONTROL DESK
(4) SCORER COMPUTER
(5) 27" OR 36" OVERHEADS
(6) TV-ONLY OVERHEADS
(7) SCORESHEET VIDEO CABLES LANES 3 - 4
(8) SCORESHEET VIDEO CABLES LANE 1 - 2
(9) TO ADDITIONAL OVERHEADS
(10) TO 1/2 OF OVERHEADS

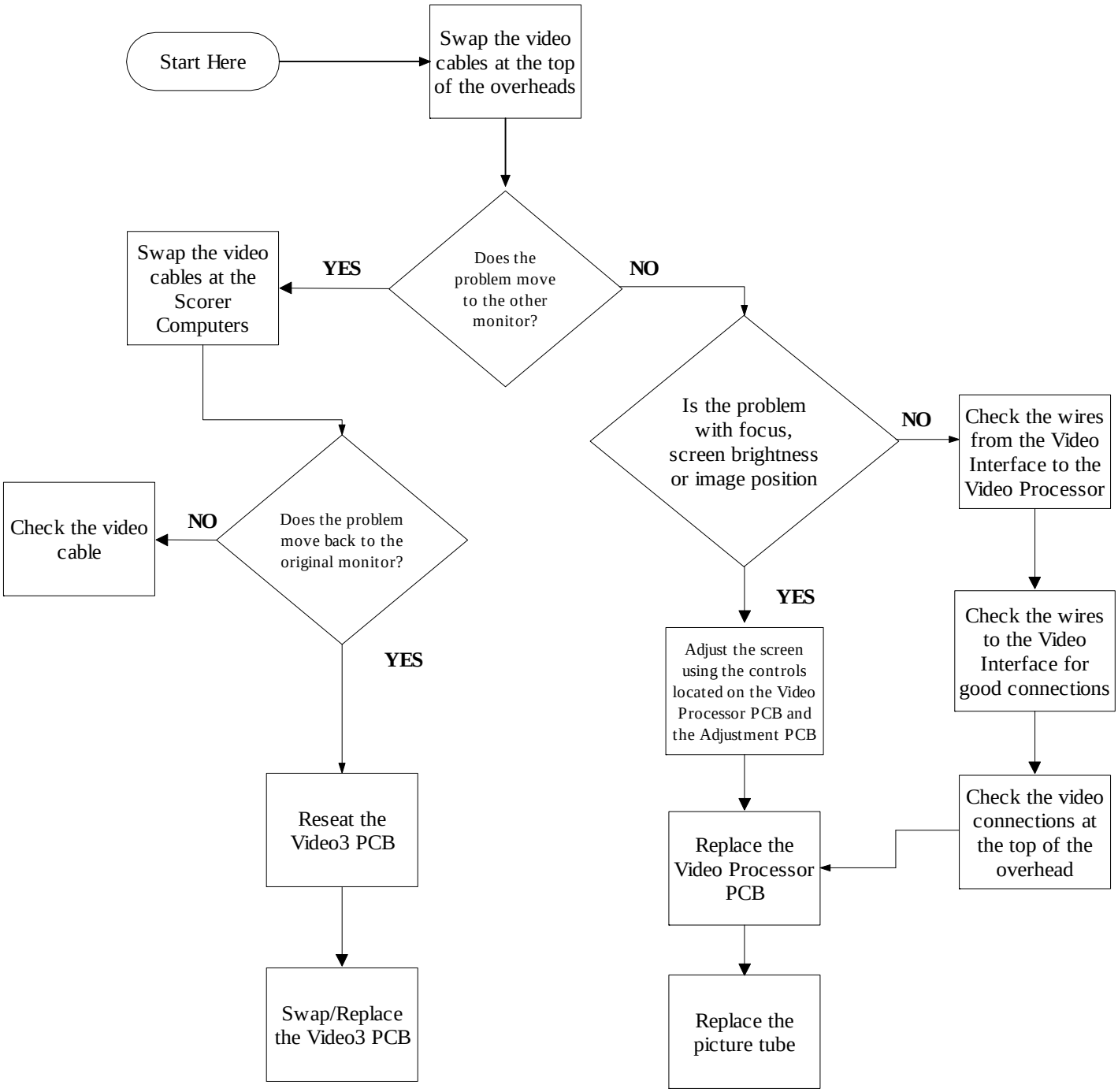
One Scorer Overhead Will Not Turn On


Start Here
Is the monitor in TV mode or off at the control desk?
NO
Cycle Power to the Scorer Computer
YES
Set the monitor to scorer mode
Swap Video Cables at the Scorer overhead monitors for the lane pair
Does the problem move to the other monitor?
YES
Swap Video Cables at the Scorer Computer for the lane pair
NO
Check the fuses in the overhead monitor
Does the problem move back to the original monitor?
NO
Check the video cable for a bad connection or broken wire
YES
Reseat the Video3 PCB
Replace the VIdeo3 PCB
Does the relay inside the overhead energize?
YES
NO
Is there 120VAC at both sides of the contacts on the relay?
NO
YES
IS LED D4 "On"?
NO
Is LED D18 "On"
NO
YES
YES
Check the wires to the replay for good connections
Check the cables from the top of the monitor to the Video Interface PCB
Replace the Video Processor PCB
Replace the picture tube
Replace the relay
Replace the Video Interface PCB
Replace the Transformer

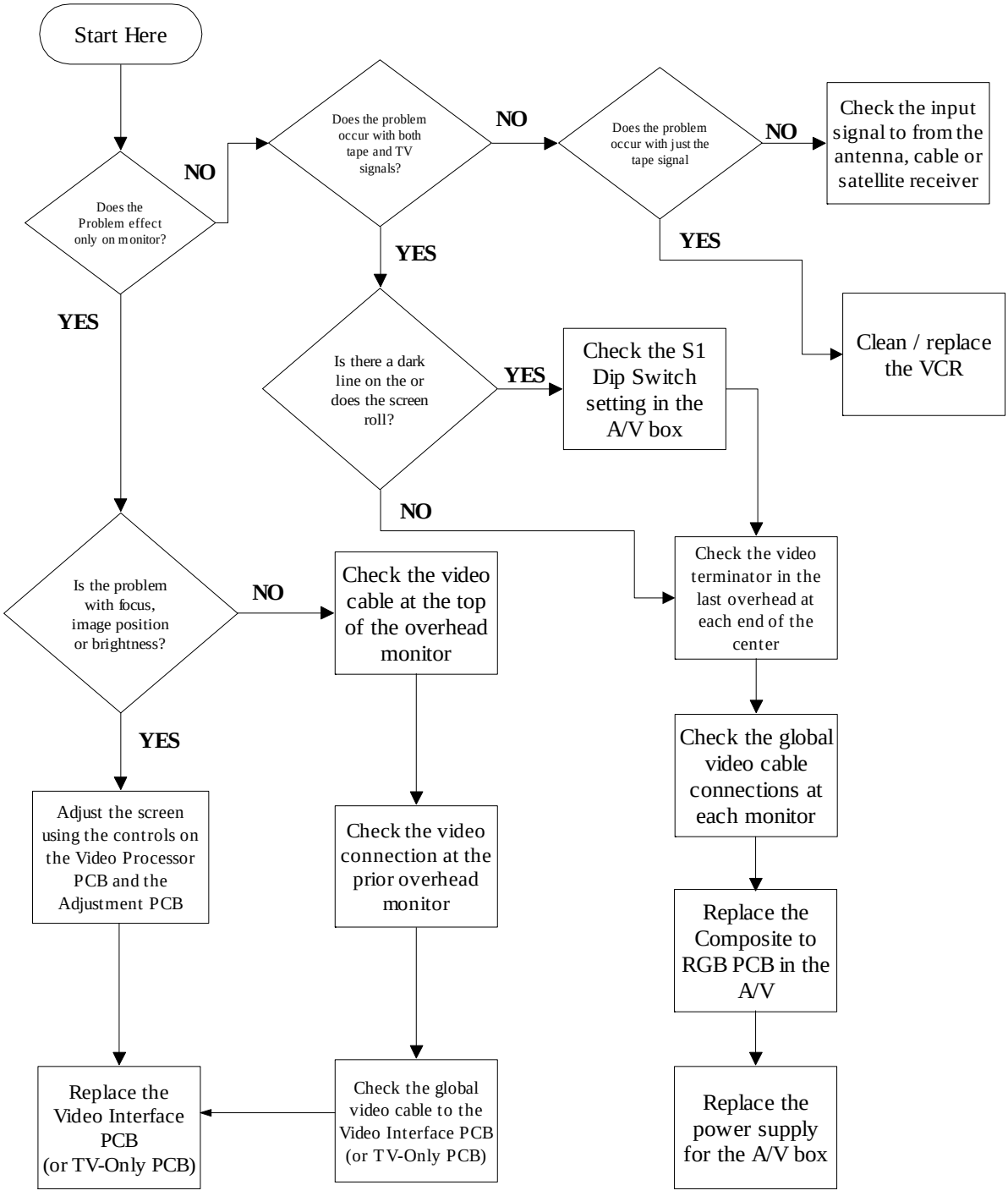
Both Scorer Overhead Monitors Will Not Turn On


Start Here
Is the monitor in TV mode or off at the control desk?
YES
Set the monitor to scorer mode
NO
Check the fuses in the overhead monitor
Check the input voltage setup for each monitor
Reseat the Video3 PCB
Cycle Power to the Scorer Computer
Swap/Replace the Video3 PCB
Check the video cables to each overhead

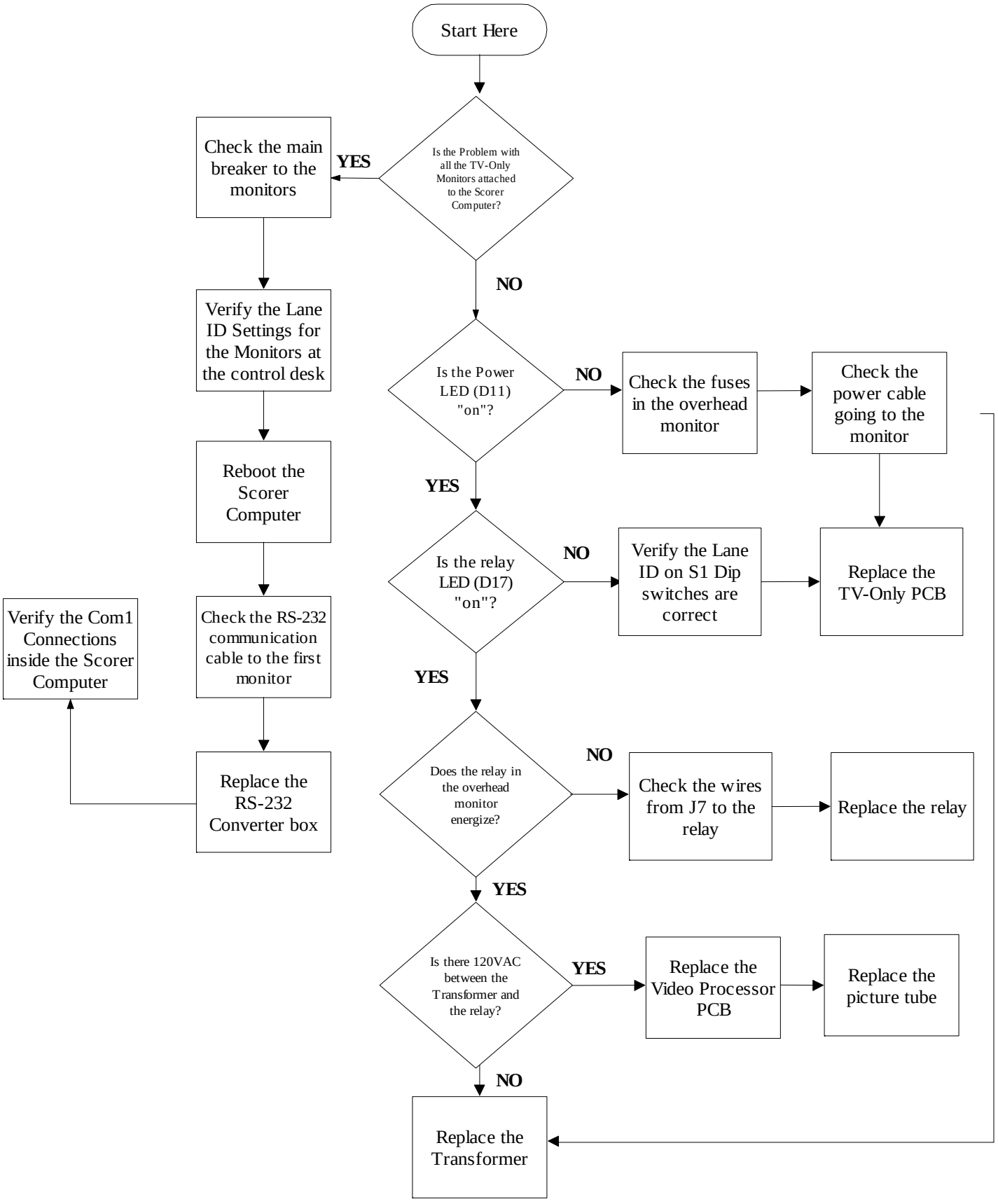
The Video On One Scorer Overhead Monitor Is Bad


Start Here
Swap the video cables at the top of the overheads
Does the problem move to the other monitor?
YES
Swap the video cables at the Scorer Computers
NO
Is the problem with focus, screen brightness or image position
NO
Check the wires from the Video Interface to the Video Processor
Check the wires to the Video Interface for good connections
Check the video connections at the top of the overhead
YES
Adjust the screen using the controls located on the Video Processor PCB and the Adjustment PCB
Replace the Video Processor PCB
Replace the picture tube
Does the problem move back to the original monitor?
NO
Check the video cable
YES
Reseat the Video3 PCB
Swap/Replace the Video3 PCB

The TV Picture On One Or Multiple Monitors is Bad


Start Here
Does the Problem effect only on monitor?
NO
YES
Does the problem occur with both tape and TV signals?
NO
YES
Does the problem occur with just the tape signal
NO
YES
Check the input signal to from the antenna, cable or satellite receiver
Clean / replace the VCR
Is there a dark line on the or does the screen roll?
YES
NO
Check the S1 Dip Switch setting in the A/V box
Is the problem with focus, image position or brightness?
NO
YES
Check the video cable at the top of the overhead monitor
Check the video terminator in the last overhead at each end of the center
Check the global video cable connections at each monitor
Replace the Composite to RGB PCB in the A/V
Replace the power supply for the A/V box
Adjust the screen using the controls on the Video Processor PCB and the Adjustment PCB
Check the video connection at the prior overhead monitor
Check the global video cable to the Video Interface PCB (or TV-Only PCB)
Replace the Video Interface PCB (or TV-Only PCB)

TV-Only Monitor(s) Will Not Turn On

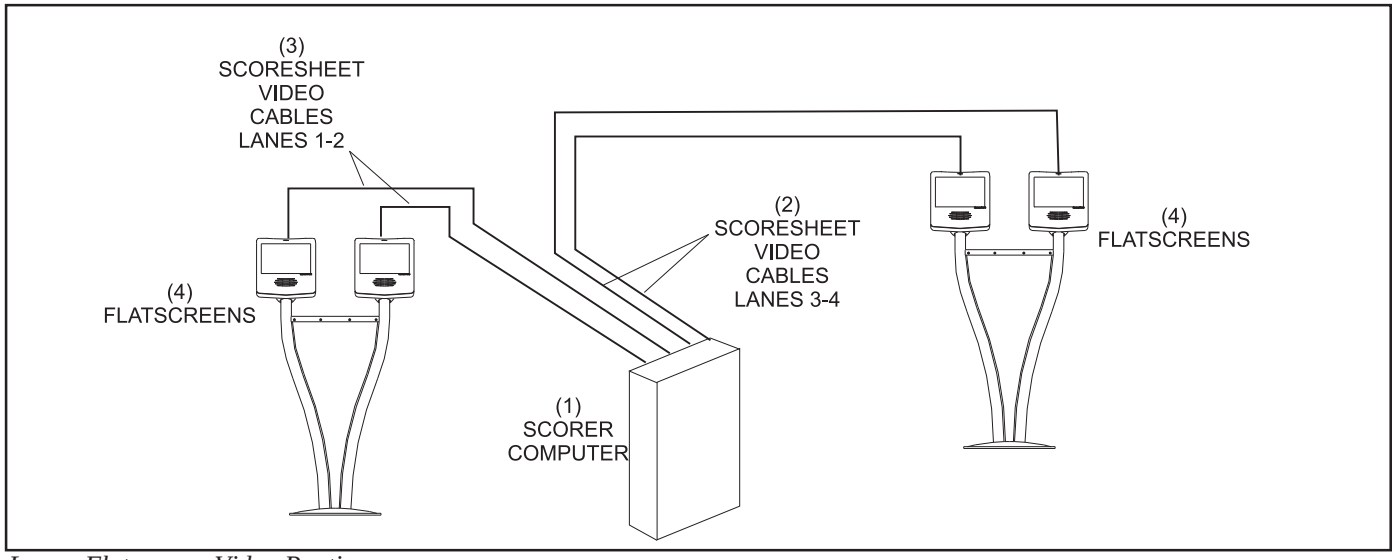

Start Here
Is the Problem with all the TV-Only Monitors attached to the Scorer Computer?
YES
Check the main breaker to the monitors
NO
Verify the Lane ID Settings for the Monitors at the control desk
Reboot the Scorer Computer
Check the RS-232 communication cable to the first monitor
Verify the Com1 Connections inside the Scorer Computer
Replace the RS-232 Converter box
Is the Power LED (D11) "on"?
NO
Check the fuses in the overhead monitor
Check the power cable going to the monitor
YES
Is the relay LED (D17) "on"?
NO
Verify the Lane ID on S1 Dip switches are correct
Replace the TV-Only PCB
YES
Does the relay in the overhead monitor energize?
NO
Check the wires from J7 to the relay
Replace the relay
YES
Is there 120VAC between the Transformer and the relay?
YES
Replace the Video Processor PCB
Replace the picture tube
NO
Replace the Transformer

Lower LCD Display Issues

Circuit Description:

Scorer video for lower screens is produced by a second Video3 PCB installed in the Scorer Computer. The LCD Interface PCB converts the video so that it can be displayed by the LCD screens. The video is sent to the lower screens through the Secondary Patch Panel. The scorer video cables are exclusive to the monitor it attaches to. Refer to figures titled and *Lower Flatscreen Video Routing* and *Lower Flatscreen Wiring* .

When troubleshooting lower video issues it is important to determine whether the problem is exclusive to one screen or if the problem is on more than one. In addition it is equally important to determine if the problem is in the screen or if it is external. Swapping the video cable connections at the Scorer Computer between lanes will typically identify where the problem lies.



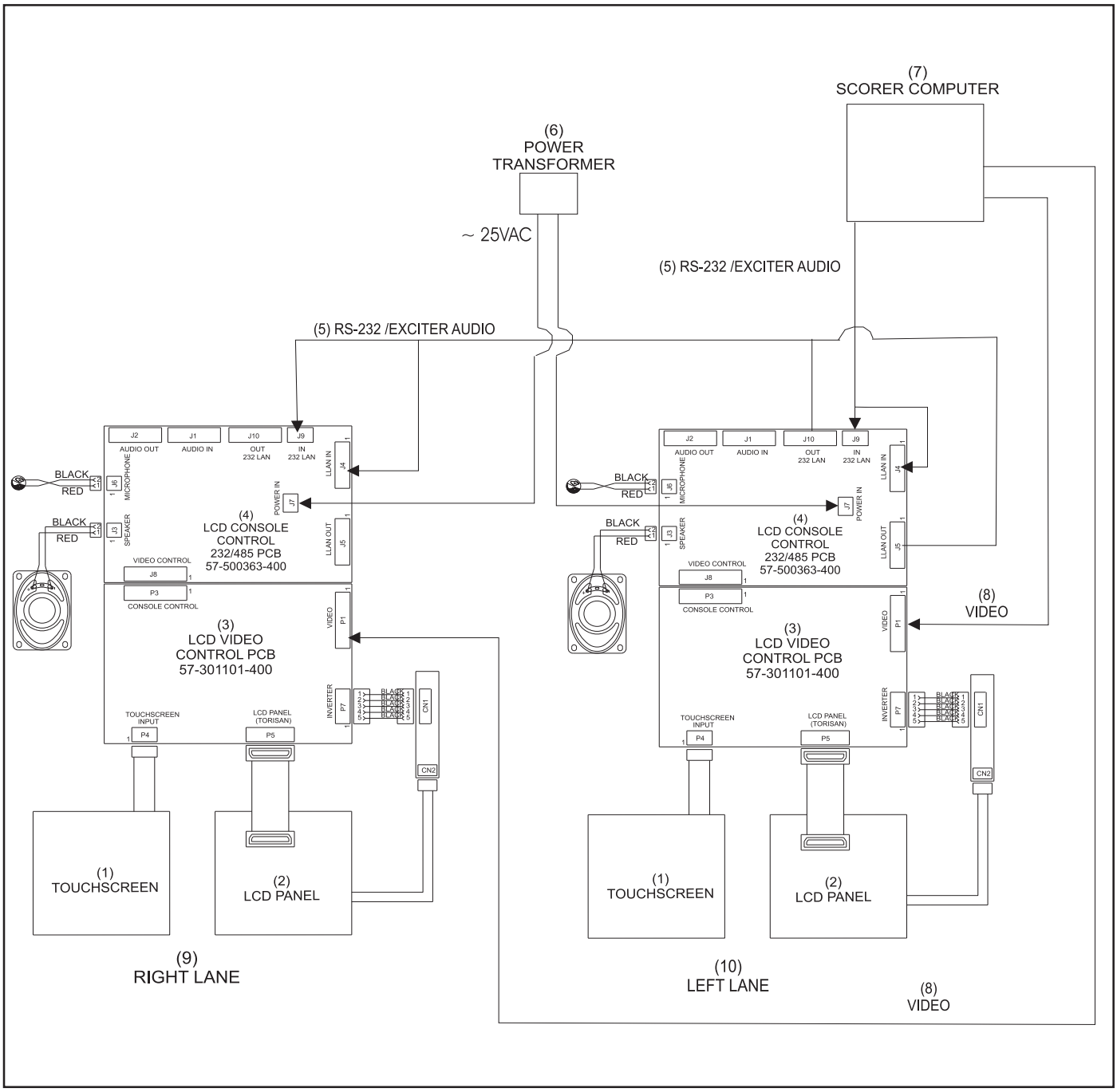
Lower Flatscreen Video Routing

(1) SCORER COMPUTER

(2) SCORESHEET VIDEO CABLES LANES 3-4

(3) SCORESHEET VIDEO CABLES LANES 1-2

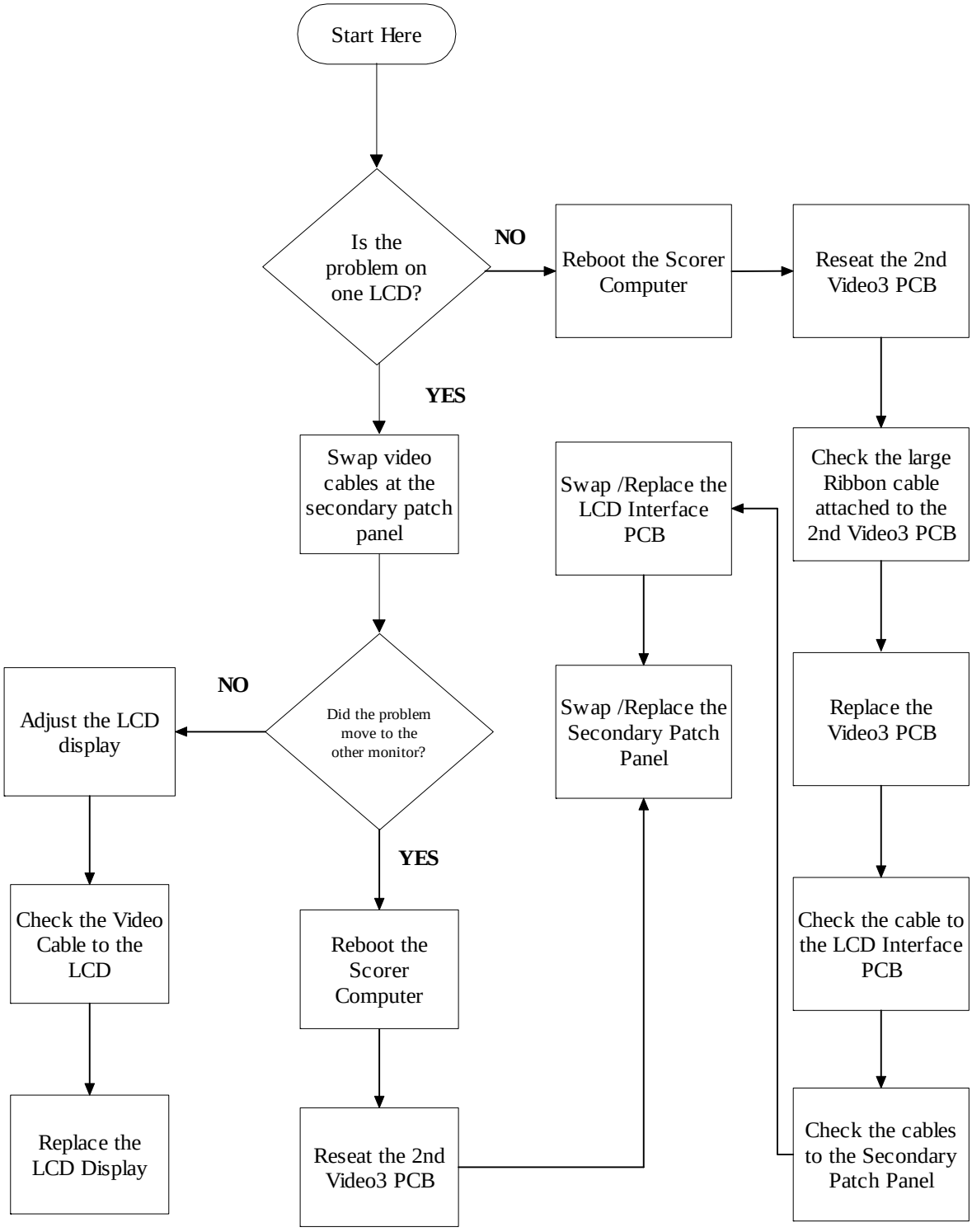
(4) FLATSCREENS



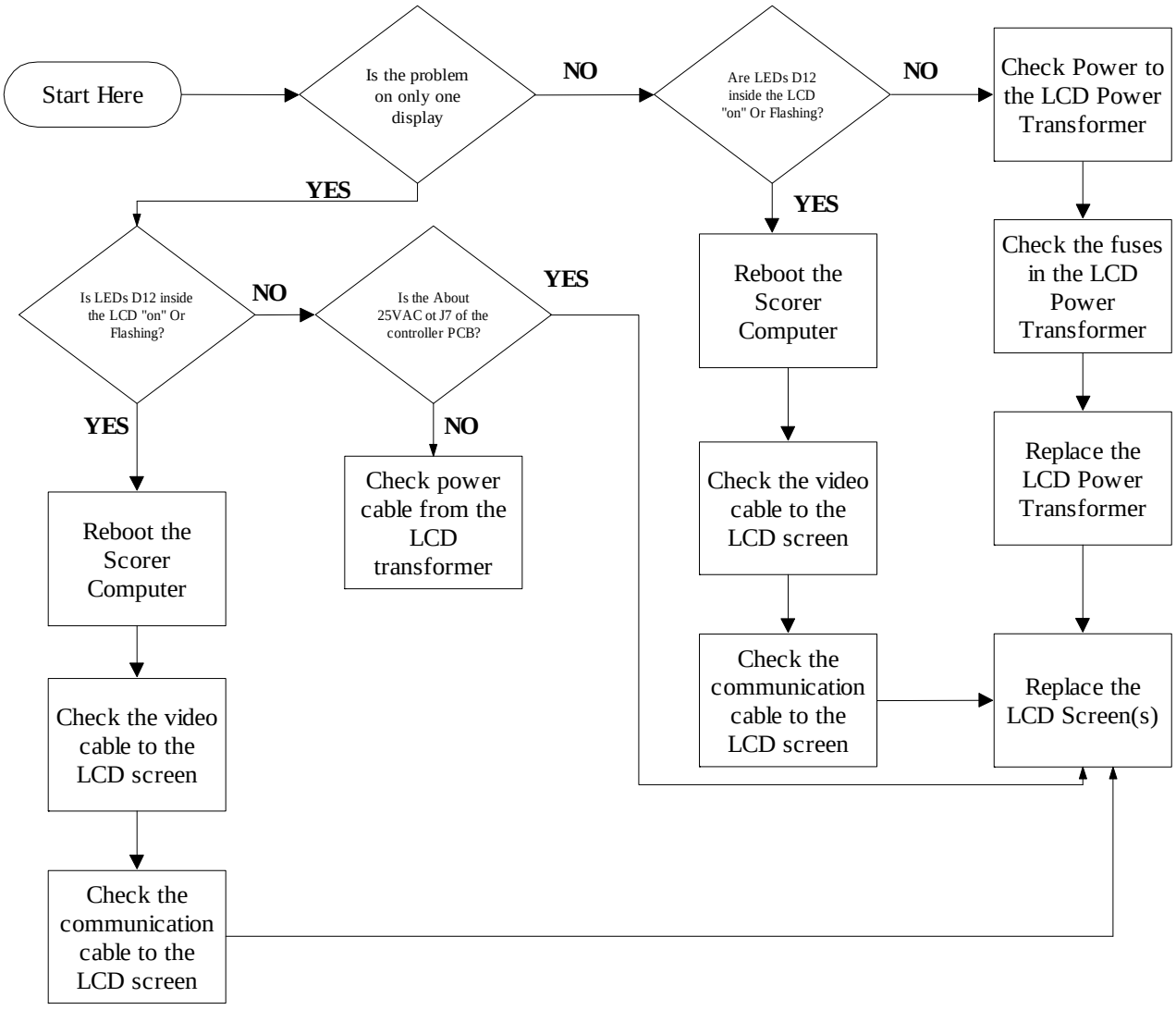
Lower Flatscreen Wiring

(1) TOUCHSCREEN
(2) LCD PANEL
(3) LCD VIDEO CONTROL PCB 57-301101-400
(4) LCD CONSOLE CONTROL RS232/485 PCB 57-500363-400
(5) RS-232/EXCITER AUDIO
(6) POWER TRANSFORMER
(7) SCORER COMPUTER
(8) VIDEO
(9) RIGHT LANE
(10) LEFT LANE

The Picture on LCD Flatscreen(s) Is Bad


Start Here
Is the problem on one LCD?
NO
Reboot the Scorer Computer
Reseat the 2nd Video3 PCB
YES
Swap video cables at the secondary patch panel
Swap /Replace the LCD Interface PCB
Check the large Ribbon cable attached to the 2nd Video3 PCB
Did the problem move to the other monitor?
NO
Adjust the LCD display
Swap /Replace the Secondary Patch Panel
Replace the Video3 PCB
YES
Check the Video Cable to the LCD
Reboot the Scorer Computer
Check the cable to the LCD Interface PCB
Replace the LCD Display
Reseat the 2nd Video3 PCB
Check the cables to the Secondary Patch Panel

LCD Flatscreen(s) Will Not Turn On


Start Here
Is the problem on only one display
NO
Are LEDs D12 inside the LCD "on" Or Flashing?
NO
Check Power to the LCD Power Transformer
YES
YES
Check the fuses in the LCD Power Transformer
Is LEDs D12 inside the LCD "on" Or Flashing?
NO
Is the About 25VAC ot J7 of the controller PCB?
YES
Reboot the Scorer Computer
Replace the LCD Power Transformer
YES
NO
Check power cable from the LCD transformer
Check the video cable to the LCD screen
Reboot the Scorer Computer
Check the communication cable to the LCD screen
Replace the LCD Screen(s)
Check the video cable to the LCD screen
Check the communication cable to the LCD screen

Console Input Problems

Circuit Description:

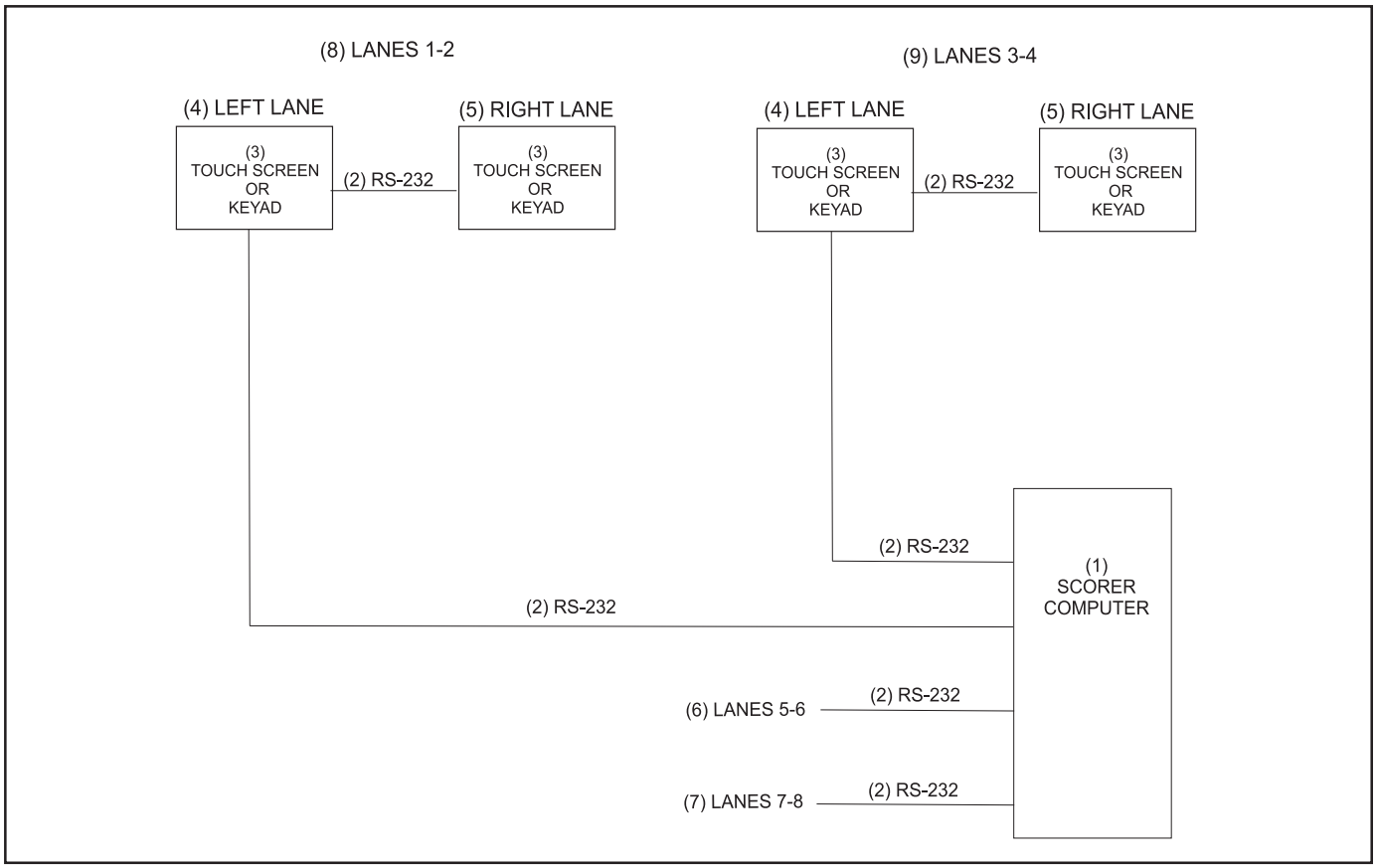
Communication to the consoles keypads or touchscreens is controlled by RS-232 interface ports on the main Video3 PCB. The communication routed to the in Primary Patch Panel from the Video3 PCB through a small ribbon cable. Each 9-pin connector on the Primary Patch Panel provide two RS-232 communication ports - one for each lane of a lane pair.

NOTE:

Also included as part of the 9-pin connector signals are exciter audio and power for the Keypad Interface PCBs.

The cable from the Scorer Computer routes to the odd lane console then continues to the even lane console.

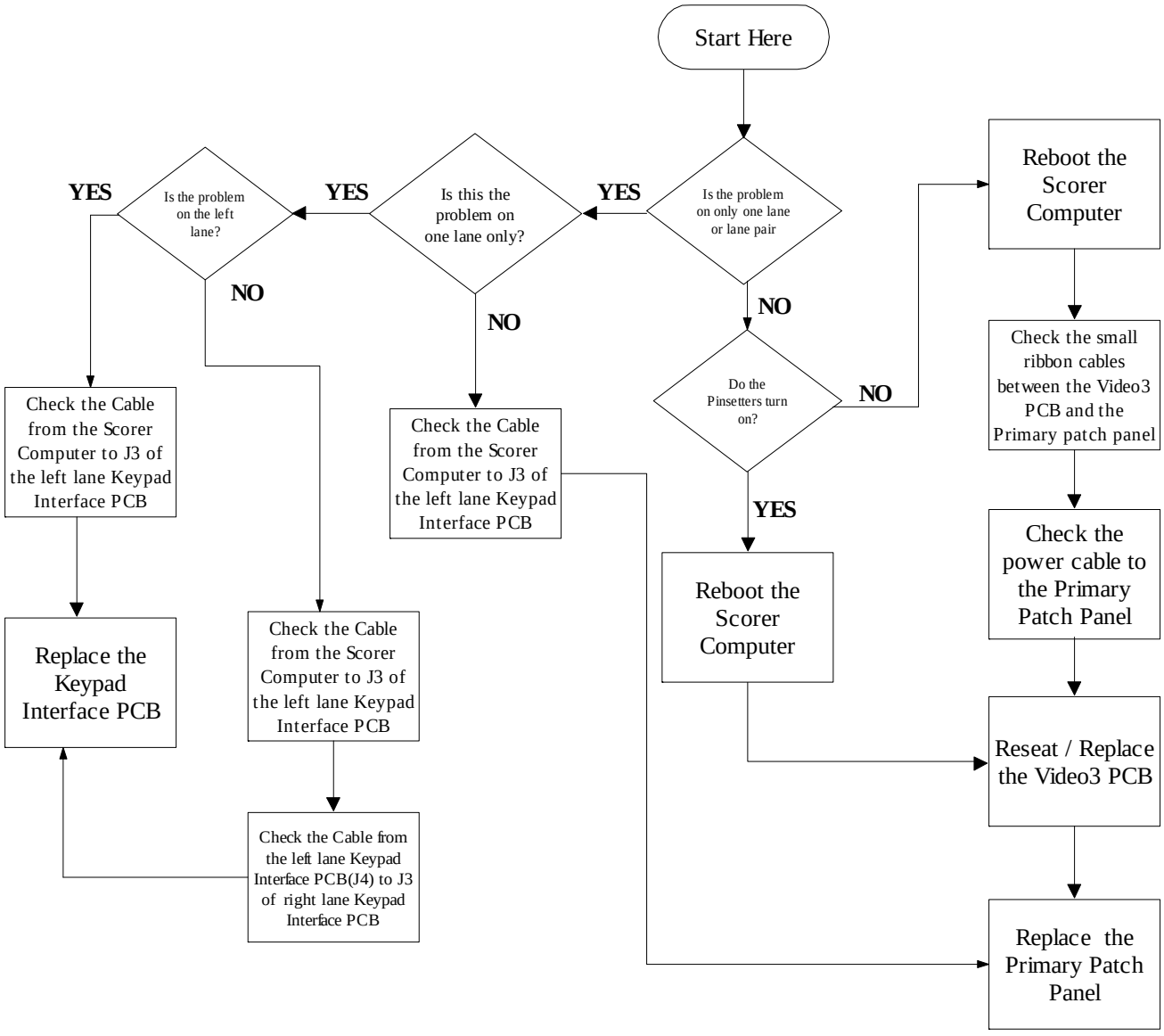
Inside the console, the Keypad Interface PCB or the LCD Controller PCB communicate the bowler's input via the RS-232 interface. Refer to figure titled *Communication Cabling.*



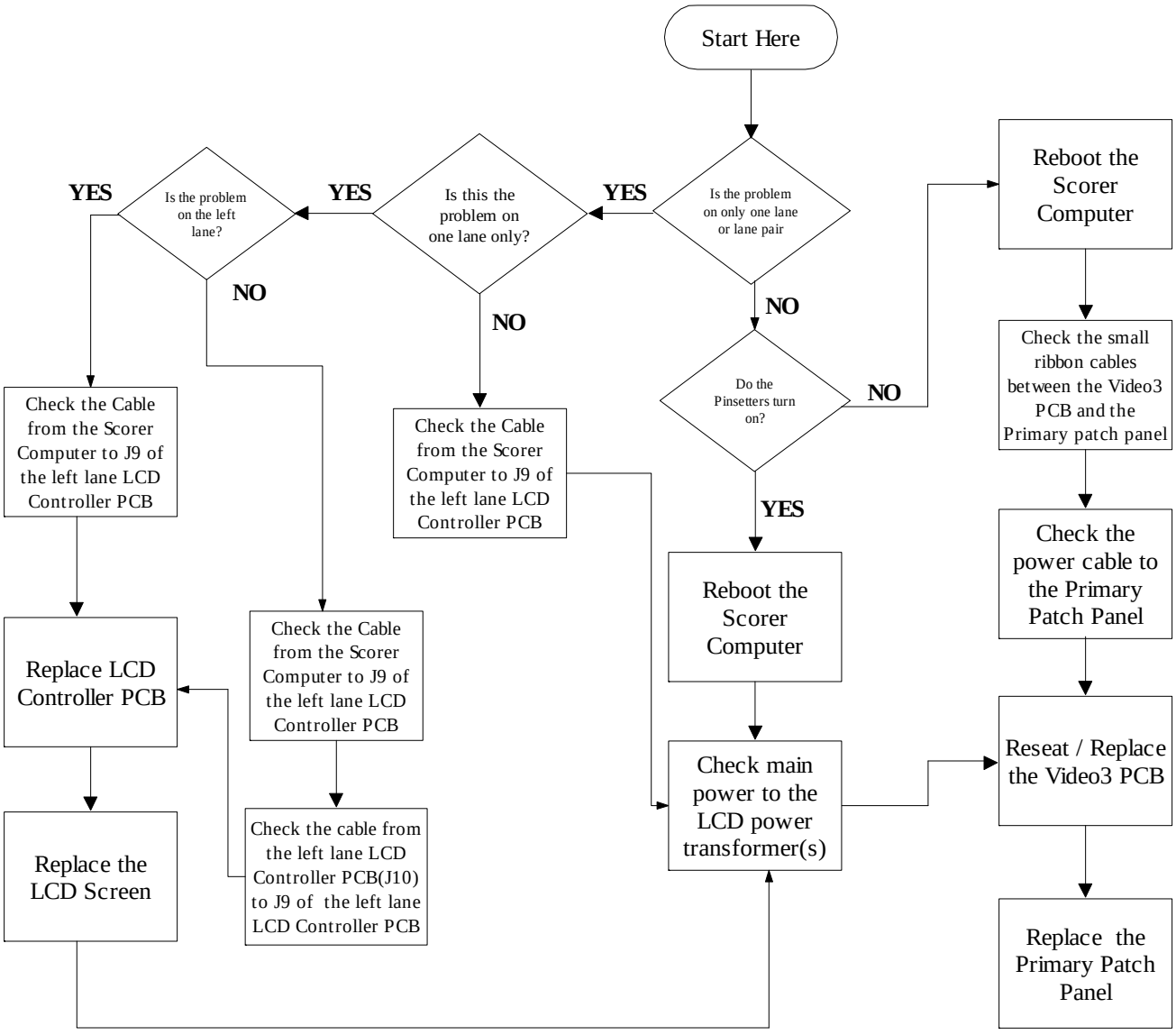
Communication Cabling

(1) SCORER COMPUTER
(2) RS-232
(3) TOUCHSCREEN OR KEYPAD
(4) LEFT LANE
(5) RIGHT LANE
(6) LANES 5-6
(7) LANES 7-8
(8) LANES 1-2
(9) LANES 3-4

No Keyboard Input


Start Here
Is the problem on only one lane or lane pair
YES
Is this the problem on one lane only?
YES
Is the problem on the left lane?
YES
NO
NO
NO
Do the Pinsetters turn on?
NO
YES
Reboot the Scorer Computer
Check the small ribbon cables between the Video3 PCB and the Primary patch panel
Check the power cable to the Primary Patch Panel
Reseat / Replace the Video3 PCB
Replace the Primary Patch Panel
Reboot the Scorer Computer
Check the Cable from the Scorer Computer to J3 of the left lane Keypad Interface PCB
Check the Cable from the Scorer Computer to J3 of the left lane Keypad Interface PCB
Check the Cable from the Scorer Computer to J3 of the left lane Keypad Interface PCB
Replace the Keypad Interface PCB
Check the Cable from the left lane Keypad Interface PCB(J4) to J3 of right lane Keypad Interface PCB

No TouchScreen Input


Start Here
Is the problem on only one lane or lane pair
YES
Is this the problem on one lane only?
YES
Is the problem on the left lane?
YES
NO
NO
NO
Do the Pinsetters turn on?
NO
YES
Reboot the Scorer Computer
Check the small ribbon cables between the Video3 PCB and the Primary patch panel
Check the power cable to the Primary Patch Panel
Reseat / Replace the Video3 PCB
Replace the Primary Patch Panel
Reboot the Scorer Computer
Check main power to the LCD power transformer(s)
Check the Cable from the Scorer Computer to J9 of the left lane LCD Controller PCB
Check the Cable from the Scorer Computer to J9 of the left lane LCD Controller PCB
Check the Cable from the Scorer Computer to J9 of the left lane LCD Controller PCB
Check the cable from the left lane LCD Controller PCB(J10) to J9 of the left lane LCD Controller PCB
Replace LCD Controller PCB
Replace the LCD Screen

Audio Problems

Circuit Description:

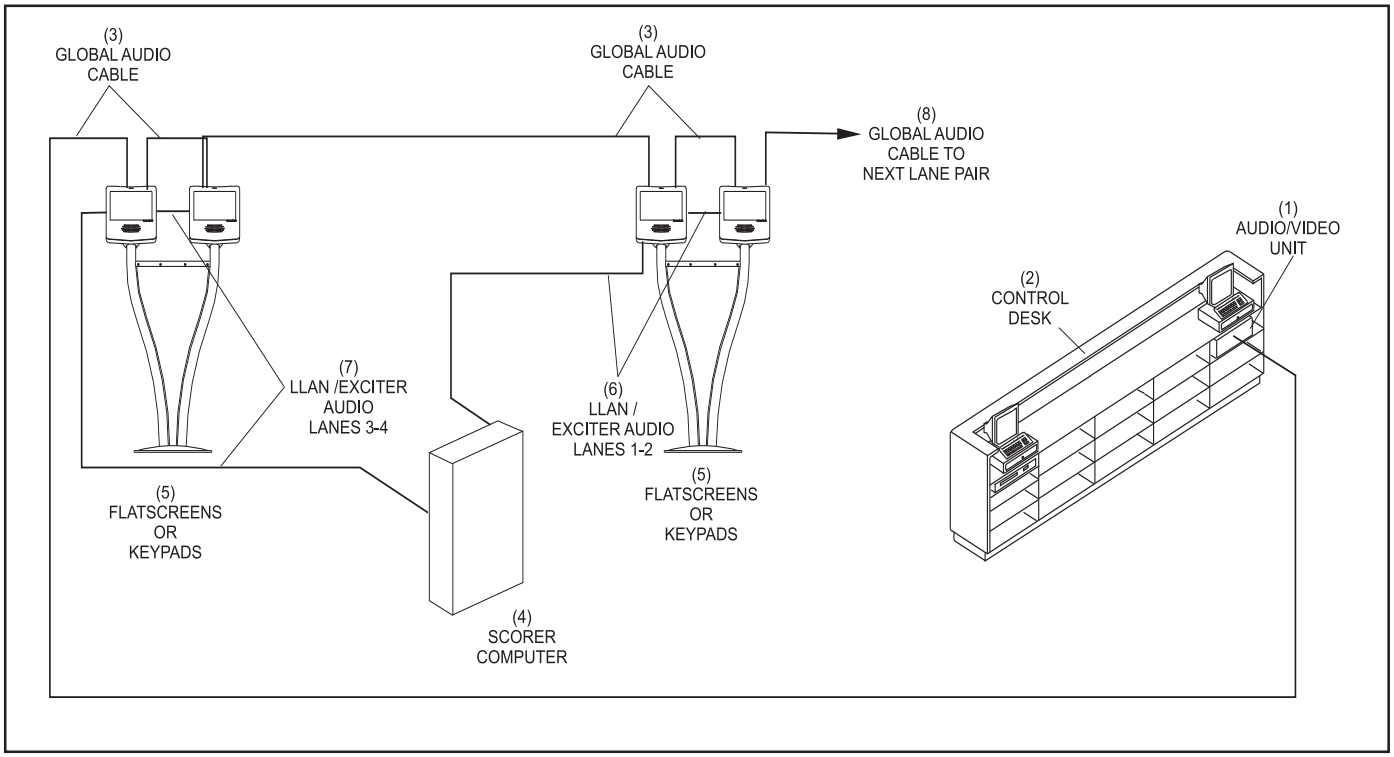
Three types of audio are used in the Vector System.

Sound Exciters originate at the Scorer Computer hard drive and are converted by the audio circuit on the Motherboard. It is then routed to the Keypad Interface PCB or Touchscreen Controller PCB inside the console from the 9-pin connectors of the Primary Patch Panel.

Intercom audio originates from the intercom handset box and is amplified by the Audio/Video box located at the control desk. It is sent from the Audio/ Video Box to the each Keypad Interface PCB or Touchscreen Controller PCB inside the consoles via the Global Audio Cable.

TV sound originate at a VCR or other suitable A/V source. Like the intercom audio it is amplified by the Audio/Video box and is sent to the Keypad Interface PCB or Touchscreen Controller PCB through the Global Audio Cable.

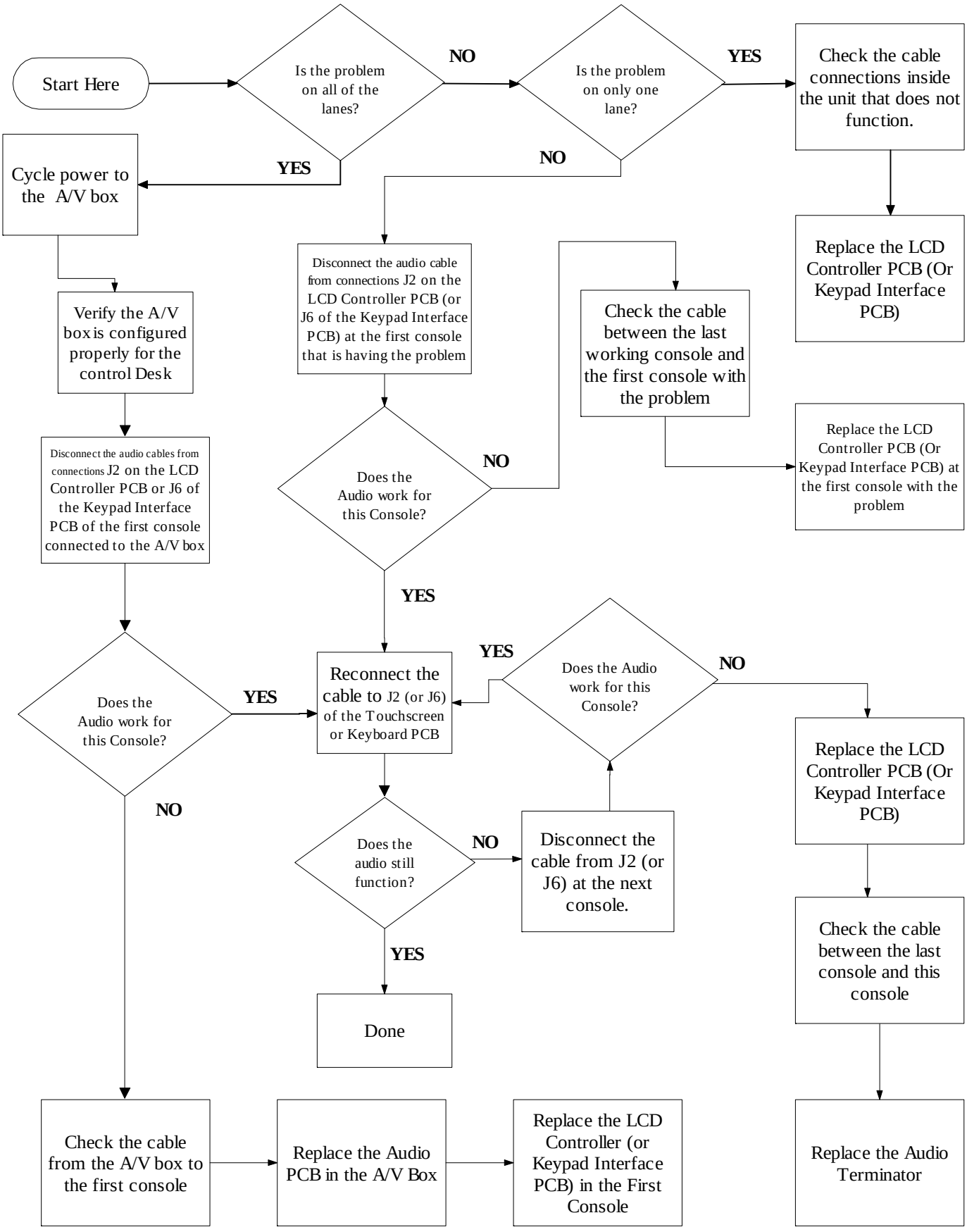
Once the audios are connected to the Keypad Interface PCB or Touchscreen Controller PCB, the desired audio can be selected by the Keypad Interface PCB or Touchscreen Controller PCB through RS-232 communication. Refer to figure titled *Audio Cabling.*



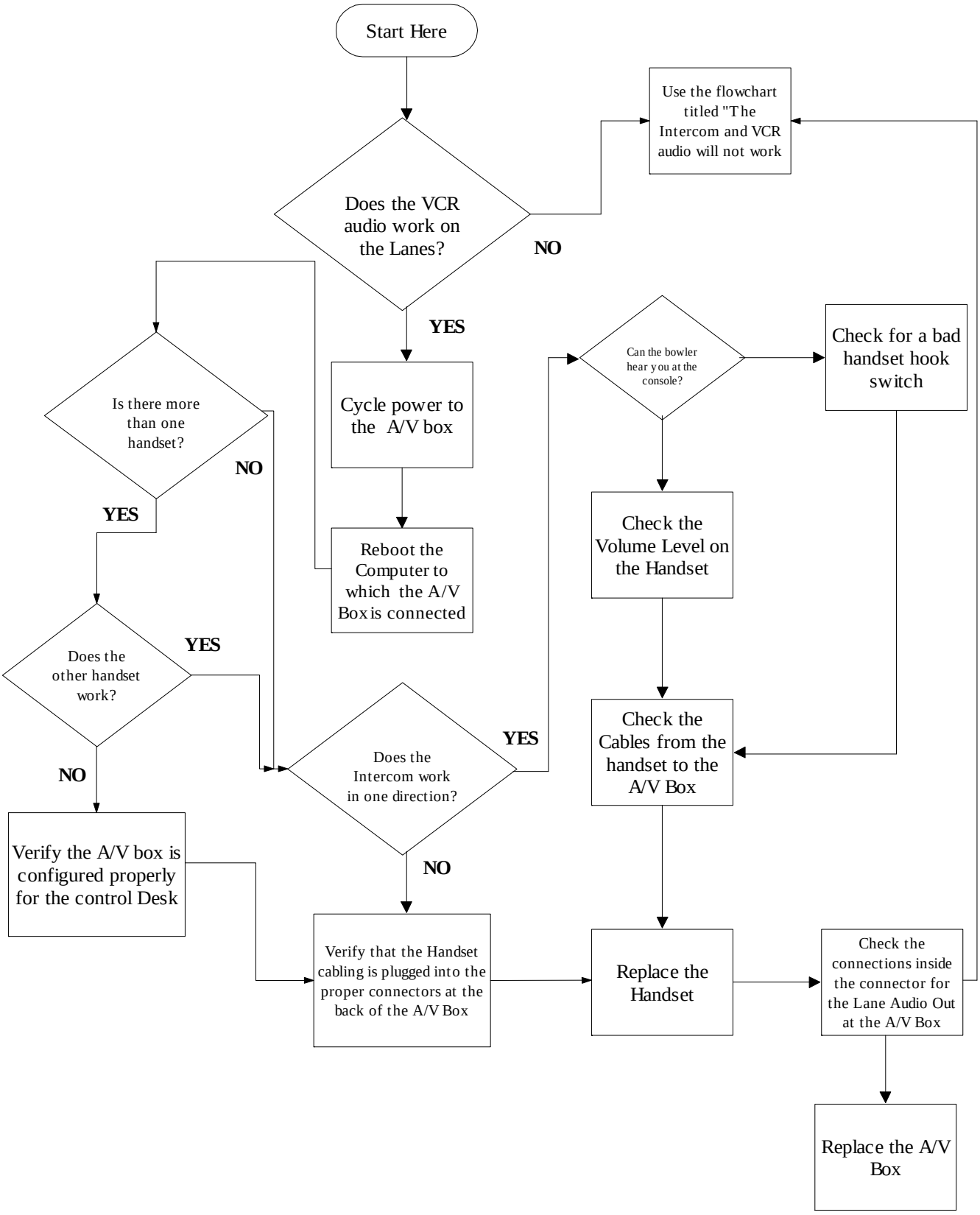
Audio Cabling

(1) AUDIO/VIDEO UNIT
(2) CONTROL DESK
(3) GLOBAL AUDIO CABLE
(4) SCORER COMPUTER
(5) FLATSCREENS OR KEYPADS
(6) LLAN EXCITER AUDIO LANES 1-2
(7) LLAN/EXCITER AUDIO LANES 3-4 PAIR
(8) GLOBAL AUDIO CABLE TO NEXT LANE

The Intercom And VCR Audio Will Not Work


Start Here
Is the problem on all of the lanes?
NO
Is the problem on only one lane?
YES
Check the cable connections inside the unit that does not function.
Replace the LCD Controller PCB (Or Keypad Interface PCB)
YES
Cycle power to the A/V box
NO
Verify the A/V box is configured properly for the control Desk
Disconnect the audio cable from connections J2 on the LCD Controller PCB (or J6 of the Keypad Interface PCB) at the first console that is having the problem
Check the cable between the last working console and the first console with the problem
Replace the LCD Controller PCB (Or Keypad Interface PCB) at the first console with the problem
Disconnect the audio cables from connections J2 on the LCD Controller PCB or J6 of the Keypad Interface PCB of the first console connected to the A/V box
Does the Audio work for this Console?
NO
YES
Does the Audio work for this Console?
YES
Reconnect the cable to J2 (or J6) of the Touchscreen or Keyboard PCB
YES
Does the Audio work for this Console?
NO
Replace the LCD Controller PCB (Or Keypad Interface PCB)
NO
Does the audio still function?
NO
Disconnect the cable from J2 (or J6) at the next console.
YES
Done
Check the cable between the last console and this console
Check the cable from the A/V box to the first console
Replace the Audio PCB in the A/V Box
Replace the LCD Controller (or Keypad Interface PCB) in the First Console
Replace the Audio Terminator

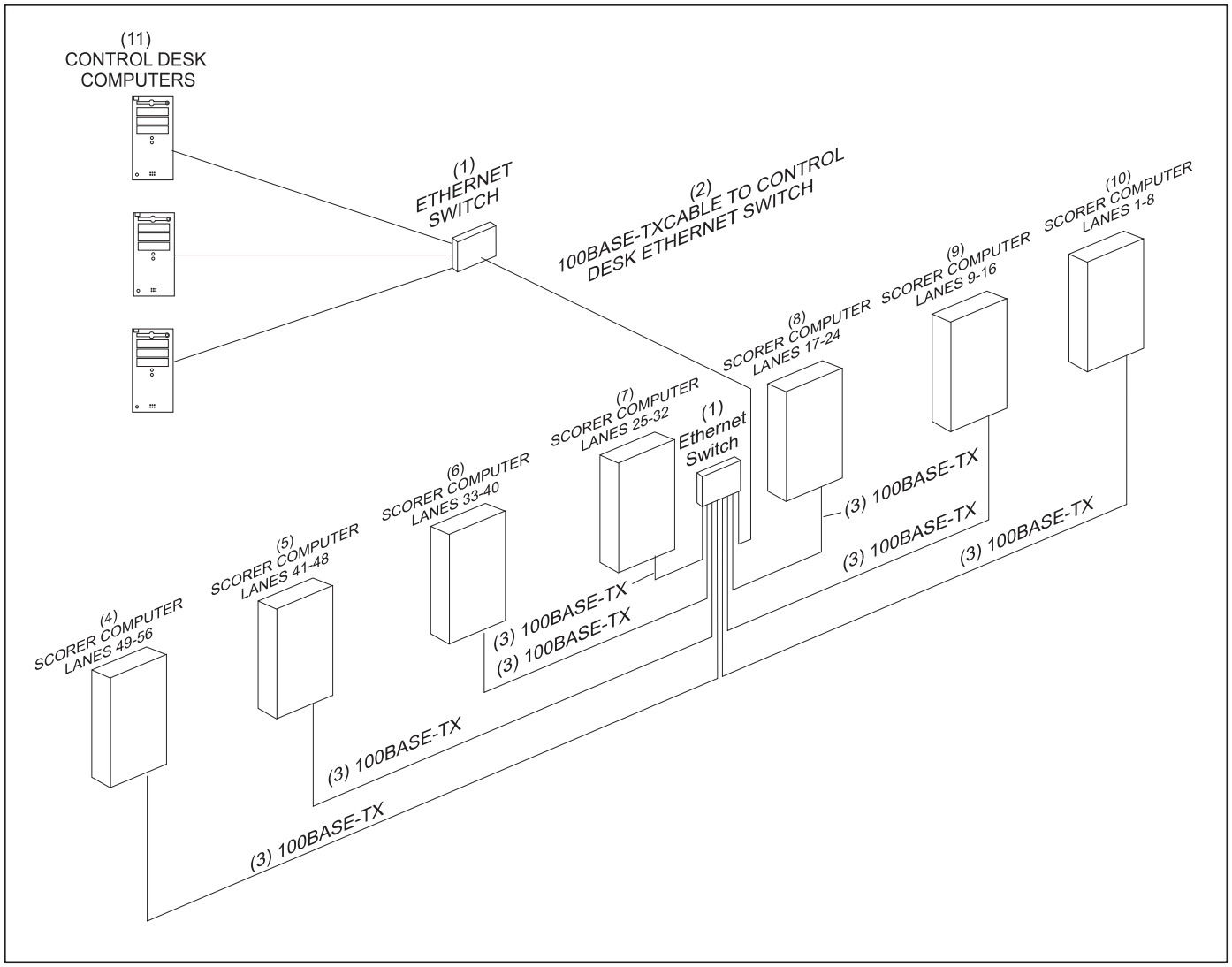
The Intercom Will Not Work On Any Lane


Start Here
Does the VCR audio work on the Lanes?
NO
Use the flowchart titled "The Intercom and VCR audio will not work
YES
Cycle power to the A/V box
Reboot the Computer to which the A/V Box is connected
Is there more than one handset?
NO
YES
Does the other handset work?
YES
NO
Verify the A/V box is configured properly for the control Desk
Does the Intercom work in one direction?
YES
NO
Verify that the Handset cabling is plugged into the proper connectors at the back of the A/V Box
Can the bowler hear you at the console?
Check for a bad handset hook switch
Check the Volume Level on the Handset
Check the Cables from the handset to the A/V Box
Replace the Handset
Check the connections inside the connector for the Lane Audio Out at the A/V Box
Replace the A/V Box

Desk Communication Issues

Circuit Description:

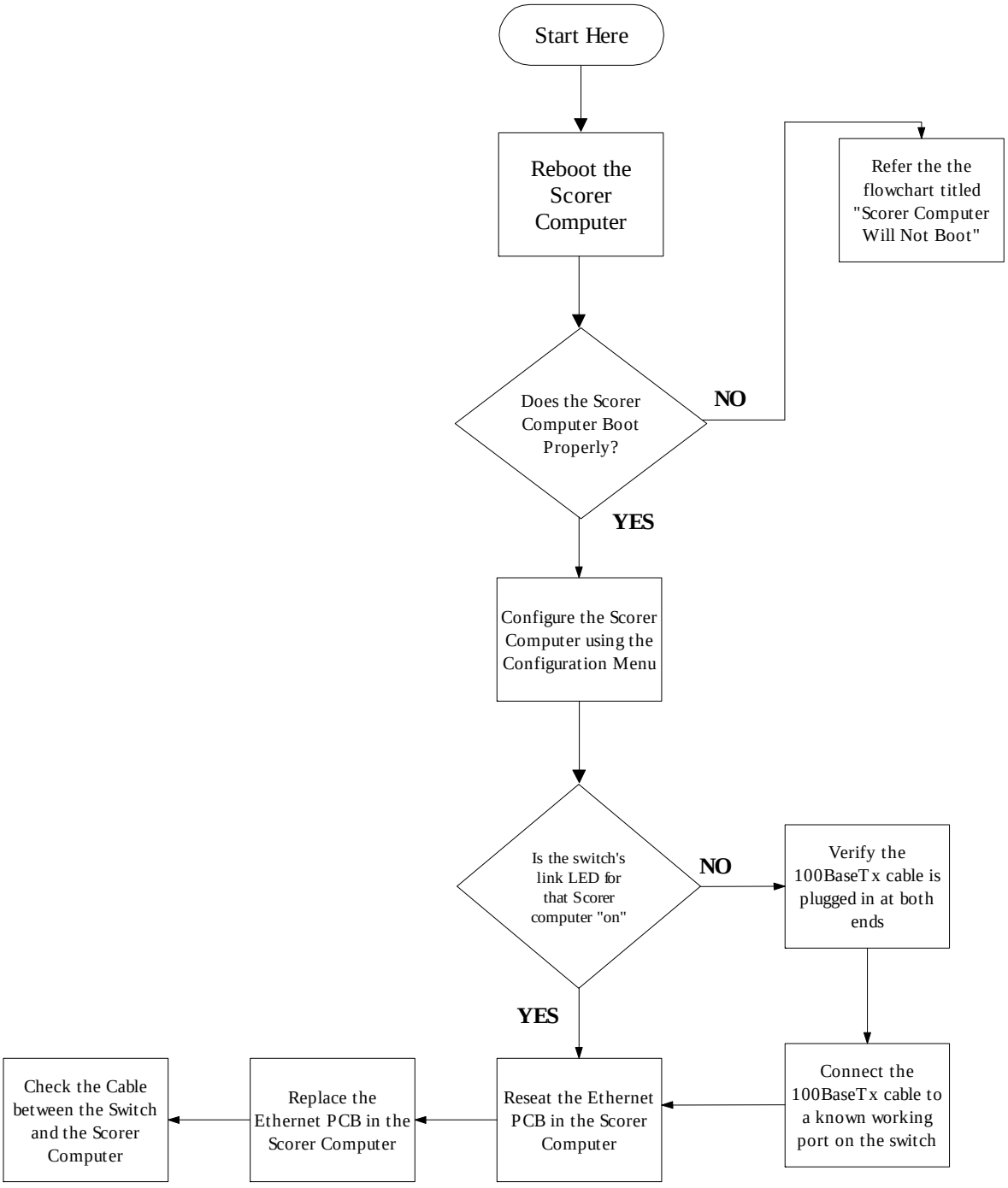
Communication from the Scorer Computer to the control desk and between computers in the Vector or Vector Plus control system is controlled through ethernet 100baseTX twisted pair cabling (sometimes referred to as CAT5 cable) and ethernet switches. Refer to the figure titled *Vector Ethernet Cabling*.



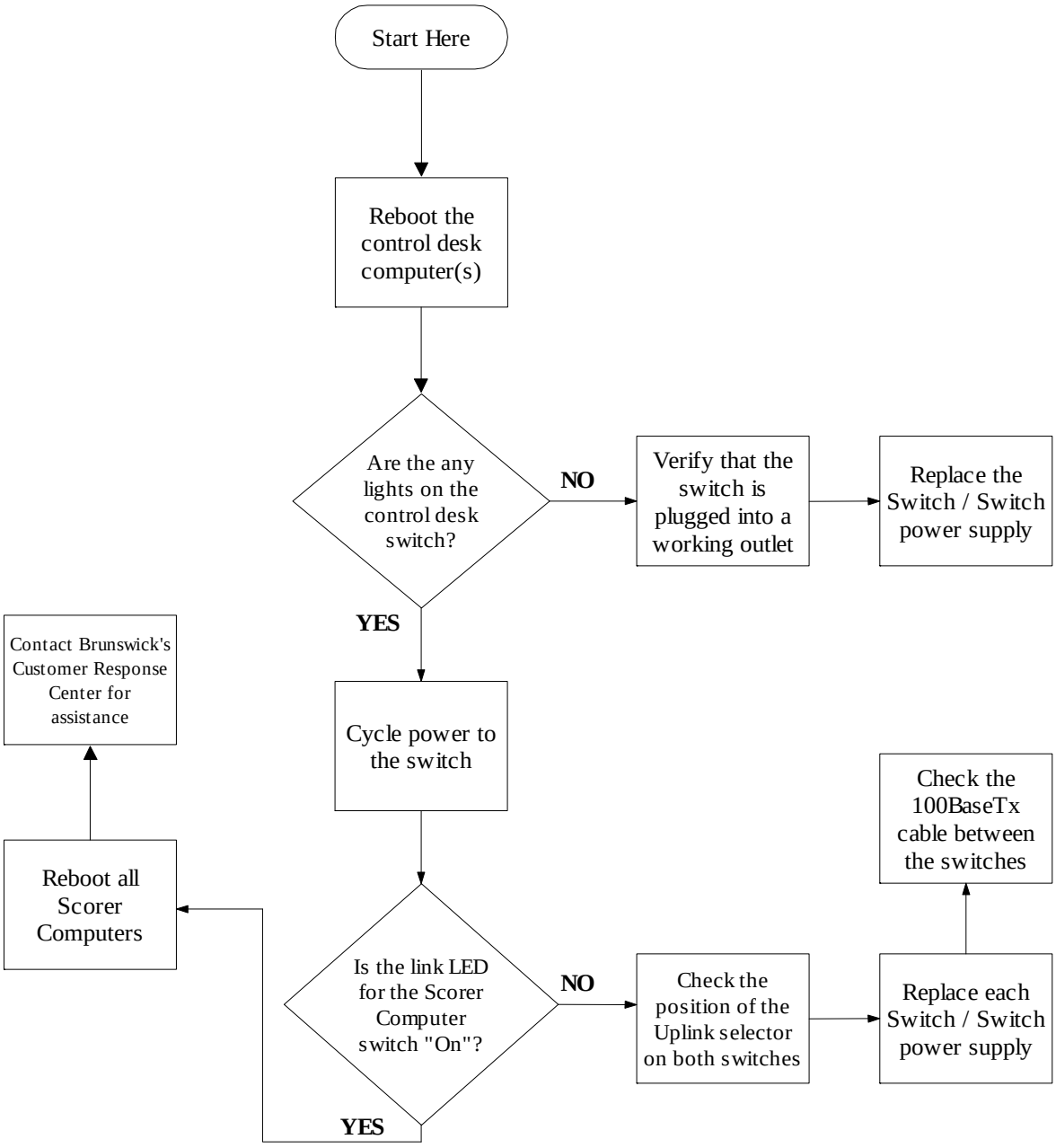
Vector Ethernet Cabling

(1) ETHERNET SWITCH DESK ETHERNET SWITCH
(2) 100BASE-TX CABLE TO CONTROL
(3) 100BASE-TX
(4) SCORER COMPUTER LANES 49-56
(5) SCORER COMPUTER LANES 41-48
(6) SCORER COMPUTER LANES 33-40
(7) SCORER COMPUTER LANES 25-32
(8) SCORER COMPUTER LANES 17-24
(9) SCORER COMPUTER LANES 9-16
(10) SCORER COMPUTER LANES 1-8
(11) CONTROL DESK COMPUTERS

Cannot Communicate To One Scorer Computer


Start Here
Reboot the Scorer Computer
Refer the the flowchart titled "Scorer Computer Will Not Boot"
Does the Scorer Computer Boot Properly?
NO
YES
Configure the Scorer Computer using the Configuration Menu
Is the switch's link LED for that Scorer computer "on"
NO
Verify the 100BaseTx cable is plugged in at both ends
YES
Check the Cable between the Switch and the Scorer Computer
Replace the Ethernet PCB in the Scorer Computer
Reseat the Ethernet PCB in the Scorer Computer
Connect the 100BaseTx cable to a known working port on the switch

No Communication To Any Scorer Computer

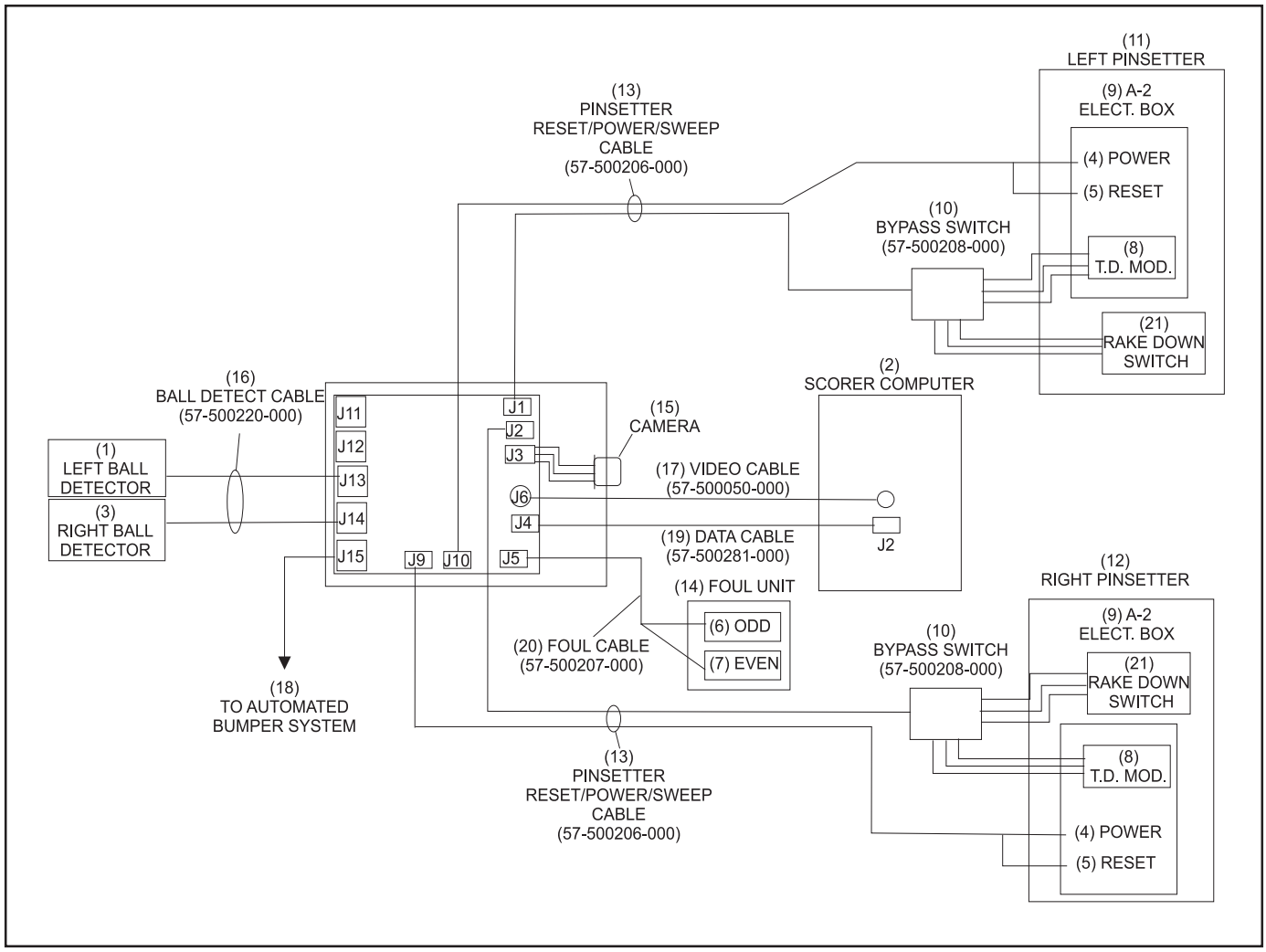

Start Here
Reboot the control desk computer(s)
Are the any lights on the control desk switch?
NO
Verify that the switch is plugged into a working outlet
Replace the Switch / Switch power supply
YES
Contact Brunswick's Customer Response Center for assistance
Cycle power to the switch
Check the 100BaseTx cable between the switches
Reboot all Scorer Computers
Is the link LED for the Scorer Computer switch "On"?
NO
Check the position of the Uplink selector on both switches
Replace each Switch / Switch power supply
YES

Pinsetter Problems

Circuit Description:

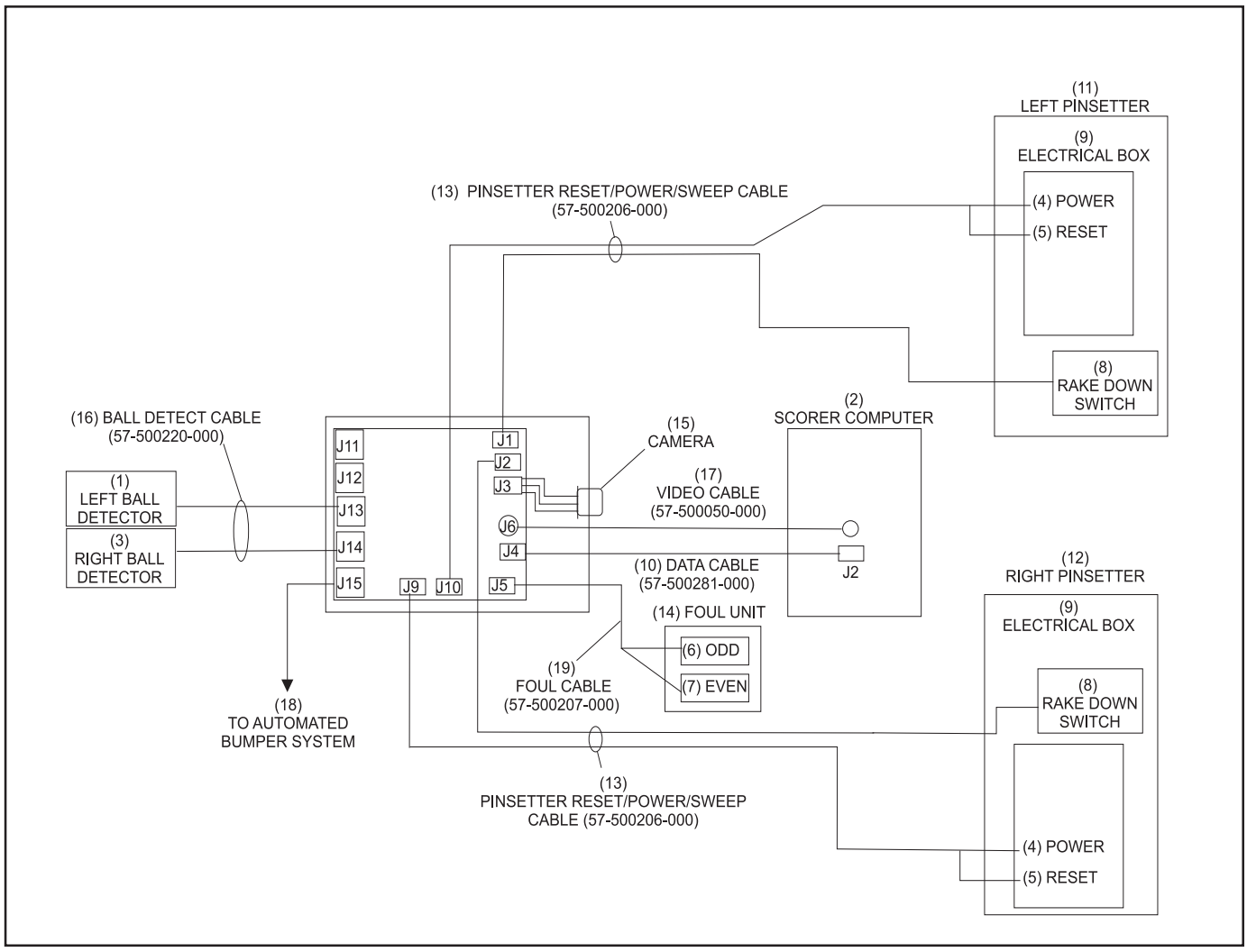
The Vector Scoring System provide basic On/Off and Reset signals for all non-GS pinsetters. For A-2 installations with Distributions PCB software versions prior to 1.03, the time delay module was disabled so that the Vector system could provide pinsetter triggering and cycling. A bypass switch was installed so that a mechanic could easily reconnect the module in the event of a scoring system failure. Refer to figure titled *Camera Wiring A-2 Pinsetters with Software V1.02 and Prior*. For installations with Distribution PCB software version 1.03 or later, the pinsetter cycles normally. The Vector system only provides auto trigger capabilities as a “back-up” in the event the pinsetter does not trigger on its own. Refer to figure titled *Camera Wiring A-2 Pinsetters with Software V1.03 and Later*.

For select AMF Pinspotters , the scoring system can provide the necessary signals for short cycle capabilities. Refer to figure titled *Camera Wiring AMF 8270SS Pinspotters*.



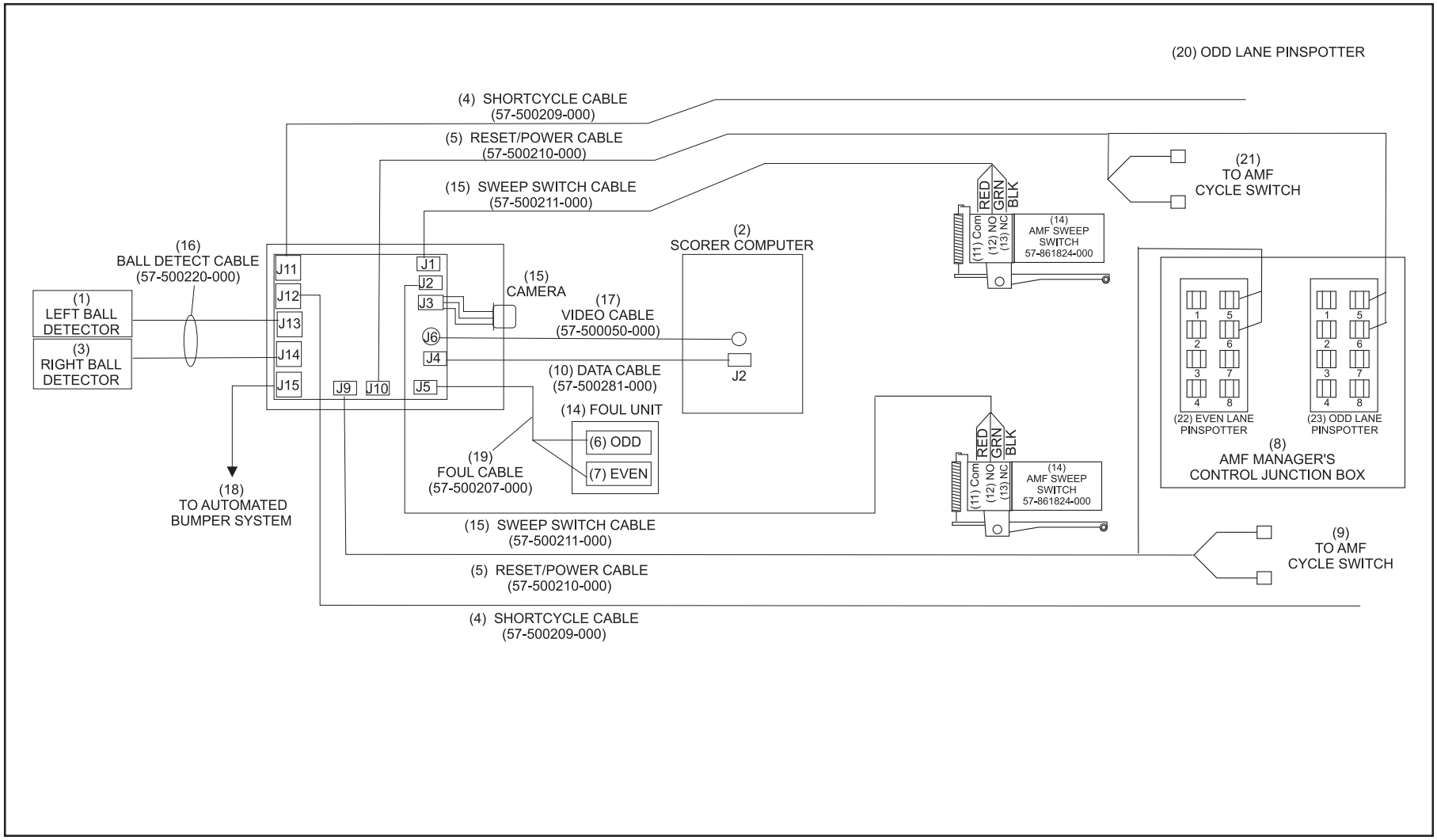
Camera Wiring A-2 Pinsetters with Software V1.02 and Prior

(1) LEFT BALL DETECTOR
(2) SCORER COMPUTER
(3) RIGHT BALL DETECTOR
(4) POWER
(5) RESET
(6) ODD
(7) EVEN
(8) T.D. MOD
(9) A-2 ELECTRICAL BOX
(10) BYPASS SWITCH (57-500208-000)
(11) LEFT PINSETTER
(12) RIGHT PINSETTER
(13) PINSETTER RESET/POWER/SWEEP CABLE (57-500206-000)
(14) FOUL UNIT
(15) CAMERA
(16) BALL DETECT CABLE (57-500220-000)
(17) VIDEO CABLE (57-500050-000)
(18) TO AUTOMATED BUMPER SYSTEM
(19) DATA CABLE (57-500281-000)
(20) FOUL CABLE (57-500207-000)
(21) RAKE DOWN SWITCH



Camera Wiring A-2 Pinsetters with Software V1.03 and Later

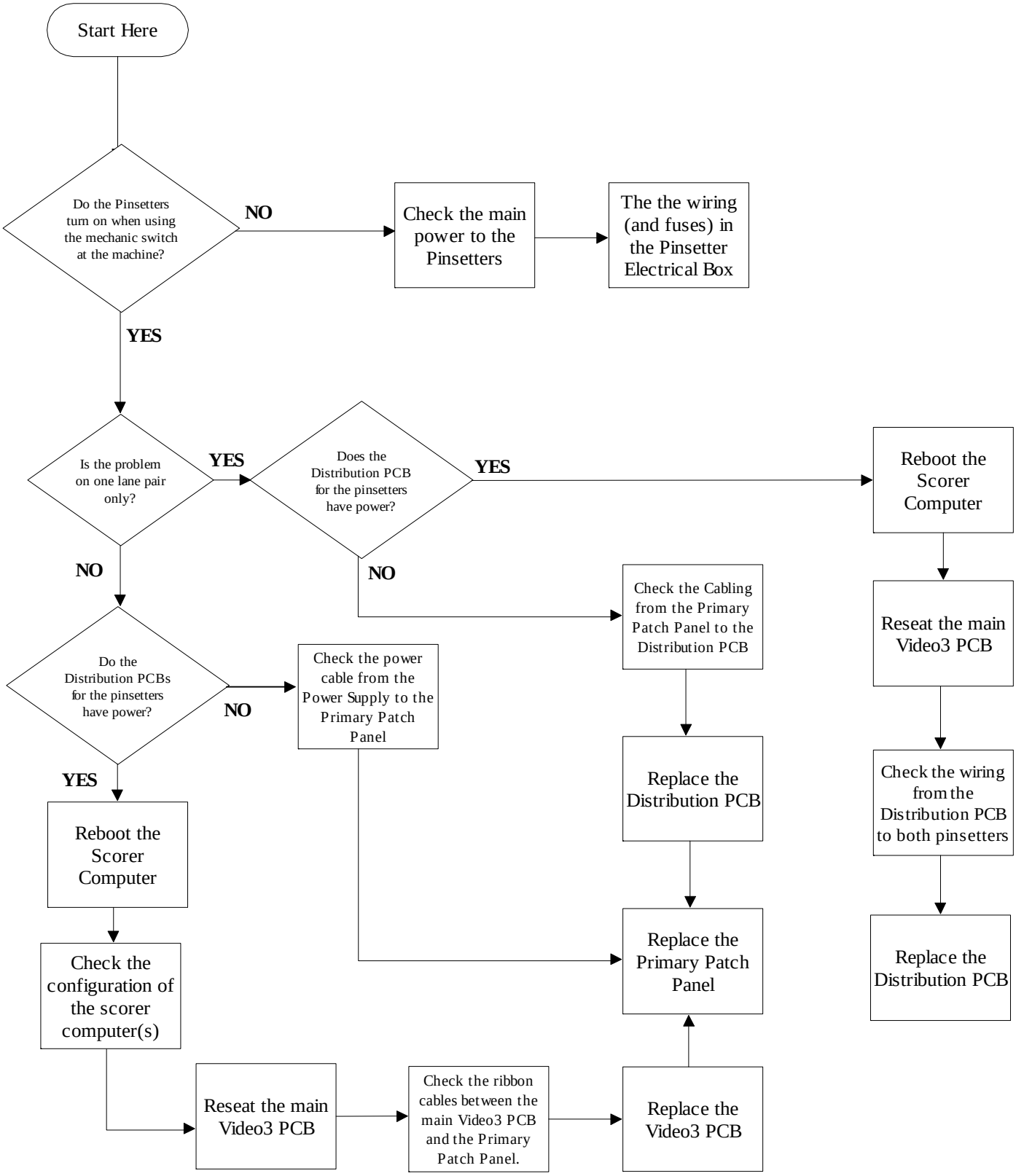
(1) LEFT BALL DETECTOR
(2) SCORER COMPUTER
(3) RIGHT BALL DETECTOR
(4) POWER
(5) RESET
(6) ODD
(7) EVEN
(8) RAKE DOWN SWITCH
(9) A-2 ELECTRICAL BOX
(10) DATA CABLE (57-500281-000)
(11) LEFT PINSETTER
(12) RIGHT PINSETTER
(13) PINSETTER RESET/POWER/SWEEP CABLE (57-500206-000)
(14) FOUL UNIT
(15) CAMERA
(16) BALL DETECT CABLE (57-500220-000)
(17) VIDEO CABLE (57-500050-000)
(18) TO AUTOMATED BUMPER SYSTEM
(19) FOUL CABLE (57-500207-000)



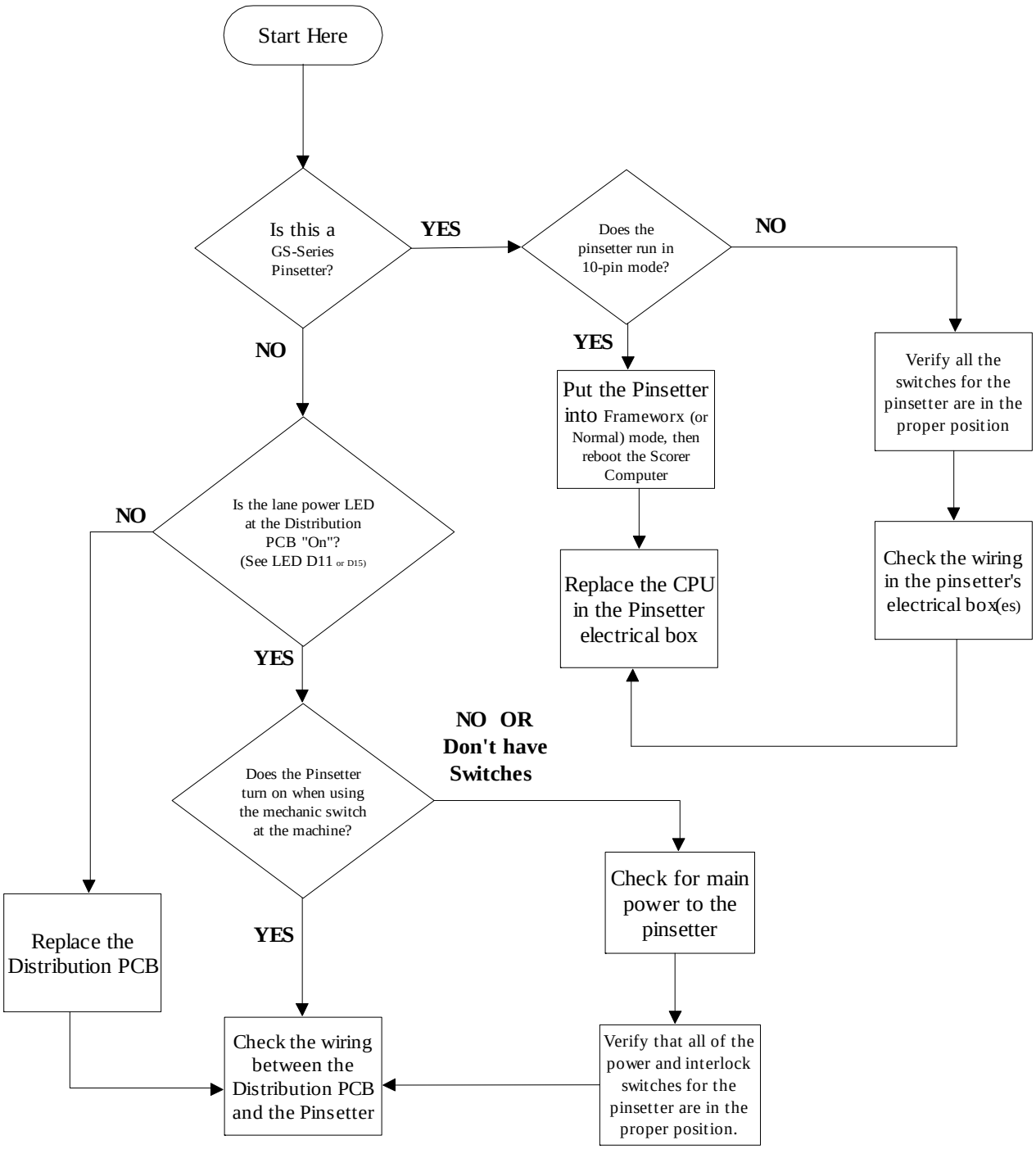
Camera Wiring AMF 8270SS Pinspotters.

(1) LEFT BALL DETECTOR	(2) SCORER COMPUTER	(3) RIGHT BALL DETECTOR
(4) SHORT CYCLE CABLE 57-500209-000	(5) RESET/POWER CABLE 57-500210-000	(6) ODD
(7) EVEN	(8) AMF MANAGER'S CONTROL JUNCTION BOX	(9) TO AMF CYCLE SWITCH
(10) DATA CABLE (57-500281-000)	(11) COM	(12) NO
(13) NO CONNECTION	(14) AMF SWITCH 57-861824-000	(15) CAMERA
(16) BALL DETECT CABLE (57-500220-000)	(17) VIDEO CABLE (57-500050-000)	(18) TO AUTOMATED BUMPER SYSTEM
(19) FOUL CABLE (57-500207-000)	(20) TO ODD LANE PINSPOTTER	(21) TO AMF CYCLE SWITCH
(22) EVEN LANE PINSPOTTER	(23) ODD LANE PINSPOTTER	

The Pinsetter For Multiple Lanes Will Not Turn On (Non GS Pinsetters)


Start Here
Do the Pinsetters turn on when using the mechanic switch at the machine?
NO
Check the main power to the Pinsetters
The the wiring (and fuses) in the Pinsetter Electrical Box
YES
Is the problem on one lane pair only?
YES
Does the Distribution PCB for the pinsetters have power?
YES
Reboot the Scorer Computer
NO
NO
Check the Cabling from the Primary Patch Panel to the Distribution PCB
Reseat the main Video3 PCB
Do the Distribution PCBs for the pinsetters have power?
NO
Check the power cable from the Power Supply to the Primary Patch Panel
Replace the Distribution PCB
Check the wiring from the Distribution PCB to both pinsetters
YES
Reboot the Scorer Computer
Replace the Primary Patch Panel
Replace the Distribution PCB
Check the configuration of the scorer computer(s)
Reseat the main Video3 PCB
Check the ribbon cables between the main Video3 PCB and the Primary Patch Panel.
Replace the Video3 PCB

The Pinsetter For One Lane Will Not Turn On (All Pinsetters)


Start Here
Is this a GS-Series Pinsetter?
YES
Does the pinsetter run in 10-pin mode?
NO
YES
Put the Pinsetter into Frameworx (or Normal) mode, then reboot the Scorer Computer
Replace the CPU in the Pinsetter electrical box
Verify all the switches for the pinsetter are in the proper position
Check the wiring in the pinsetter's electrical box(es)
NO
Is the lane power LED at the Distribution PCB "On"? (See LED D11 or D15)
YES
Does the Pinsetter turn on when using the mechanic switch at the machine?
NO OR Don't have Switches
Check for main power to the pinsetter
Verify that all of the power and interlock switches for the pinsetter are in the proper position.
YES
Replace the Distribution PCB
Check the wiring between the Distribution PCB and the Pinsetter